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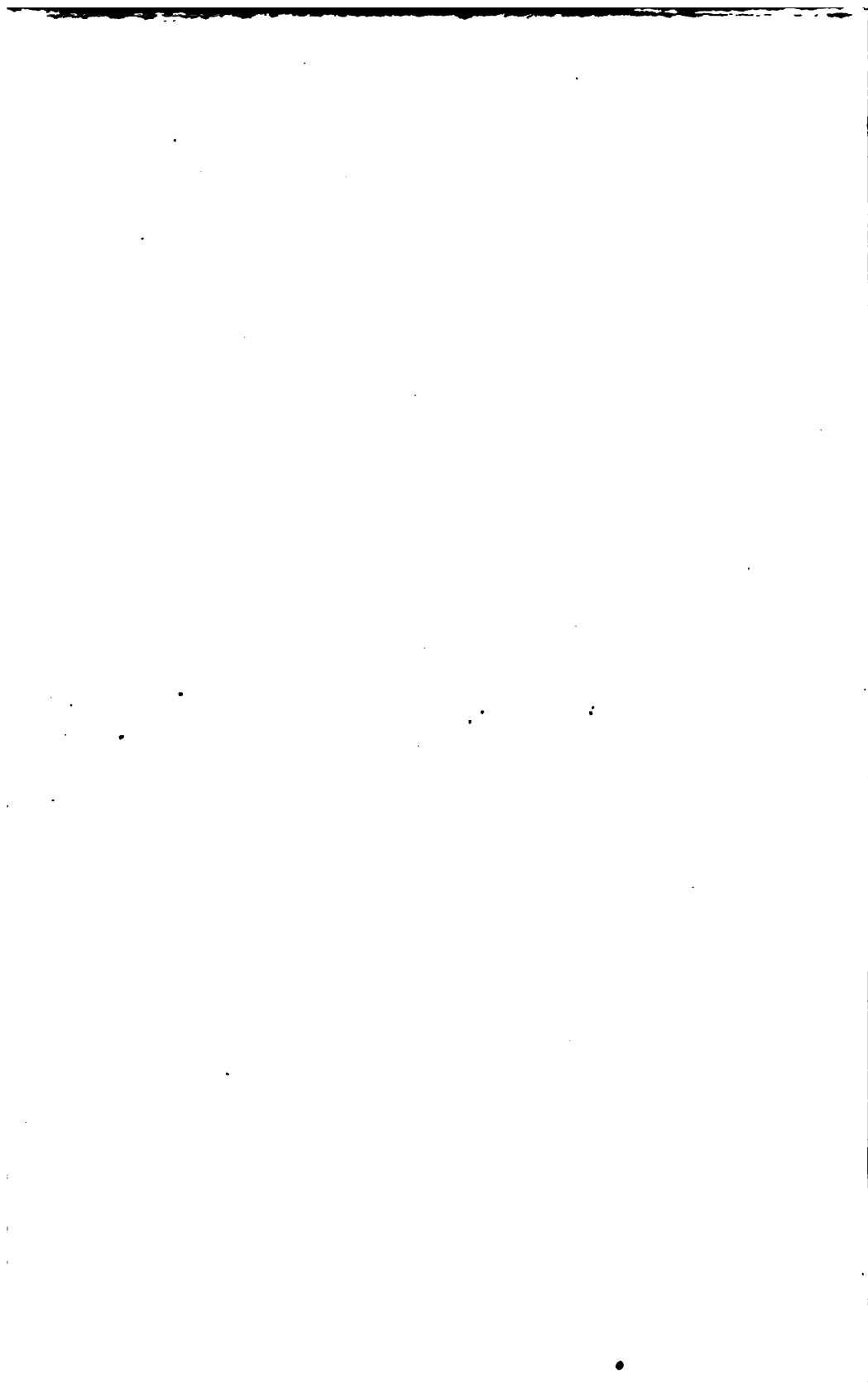








ON THE USE OF
THE NITRATE OF SILVER.



A PRACTICAL ESSAY ON THE USE
OF THE
NITRATE OF SILVER,

In the Treatment of
INFLAMMATION, WOUNDS, AND ULCERS.

BY
JOHN HIGGINBOTTOM, F.R.S.,
HON. FELLOW OF THE ROYAL COLLEGE OF SURGEONS OF ENGLAND.

THIRD EDITION, MUCH IMPROVED.



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TO

MARSHALL HALL HIGGINBOTTOM,

M.R.C.S.E., &c.,

IN RECOGNITION OF FILIAL AND PROFESSIONAL DEVOTEDNESS,

This Essay is Dedicated

BY HIS AFFECTIONATE FATHER,

THE AUTHOR.

Nottingham, July 13th, 1865.

P R E F A C E

TO

T H E T H I R D E D I T I O N .

It is now many years since I published the second edition of an "Essay on the Use of Nitrate of Silver in the Treatment of Inflammation, Wounds and Ulcers." Every succeeding year has confirmed my opinion of the importance and great utility of the method therein described, and its very successful results lead me to hope that it will ultimately supersede the old modes of treatment.

In this edition the whole has been thoroughly revised and much new matter added. It contains also the substance of papers contributed to various medical journals since the second edition was issued.

Special attention has been directed to the many erroneous views and practices still prevalent as to the mode of application, &c. (see Introduction.)

J. H.

NOTTINGHAM.

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ON THE

USE OF THE NITRATE OF SILVER.

CHAPTER I.

INTRODUCTION.

MY first attention was directed to the use of the Nitrate of Silver upwards of forty years since ; about the year 1820. I had an irritable and inflamed sore on the ulnar side of the third finger of my left hand, occasioned by a bruise. It had no disposition to heal ; and as an experiment I applied the stick of the nitrate of silver to the surface of the moist sore, and left it exposed to the air without any covering.

An eschar formed, which became adherent and hard like a piece of black sealing-wax ; the pain and inflammation subsided, the eschar remained firm and adherent, without the slightest inconvenience, for six days, when it dropped off, leaving the wound healed. My attention was particularly arrested by this novel and quick method of healing, and I was urged to further investigation, being conscious that the practice was altogether new to the profession. After several years' observation and practice in this new method of treating wounds and ulcers, I was induced

to publish my first essay, January 1st, 1826, entitled, "An Essay on the Application of the Lunar Caustic in the Treatment of Certain Wounds and Ulcers." This work was well received by the profession.

Finding the nitrate of silver a very valuable agent in arresting and subduing external inflammation, I was led, three years after my first publication, to issue a second edition, considerably enlarged.

The term "Lunar Caustic," in my first essay, I considered very erroneous, as regarded its effects; the nitrate of silver possessing a peculiar conservative property, rather than a caustic one, and was more calculated to preserve than to destroy.

In 1850, from the many erroneous views which the profession had received, both as to the method of application of the nitrate of silver, and the varying strength of the solutions made use of, I was led to publish another little work containing particular directions for its use.

Thirty-six years have now passed away since the second edition of my essay was published; and for some time I have felt that, owing to my extended use of the nitrate of silver for so many years, a third edition was required, in which the sundry papers scattered throughout different medical and surgical periodicals might be brought together. I have been also urged by my medical brethren to republish it: and I do it as a duty I owe to the profession and the public.

It remains for me now to communicate all I know

on the subject of the nitrate of silver as a standard work of reference, which I humbly conceive ought to be in the hands of every surgeon.

During the long interval since the second edition was published, I have employed the remedy daily, and can conscientiously declare that its value has daily increased in my estimation, and that, unlike most remedies proposed by the ardent inquirer in medicine and surgery, it has borne the test of experience in many other hands as well as in my own.

I could adduce a host of testimonials to this effect.

In the introduction to the second edition, I have made some suggestions respecting my anticipations as to the use of the nitrate of silver, and particularly in the several departments of the army, navy, and hospital practice. From information I have received, and numerous letters from some of the first London and provincial surgeons, I have been informed that the nitrate of silver has been used very extensively and most beneficially in each of those departments. Yet I do not think that its adoption has been so extensive in our country as in America. For many years I have heard of its being there an established remedy ; and the following advertisement, which appeared in one of our medical journals, as copied from the *American Medical Times*, is very remarkable : —“Old Plate Wanted. Dr. J. J. Chisohm, Medical Purveyor of the Rebel Army at Charleston, publishes the following card : ‘Silver plate wanted, to be converted into caustic (nitrate of silver) for the use of the

sick army. Eight dollars per ounce will be paid for all prime plate. Old spoons and old plate will answer the purpose of the medical department as well as new. Apply at medical purveyor's office, opposite Congaree House.'"

A surgeon who had been visiting Constantinople told me that a surgeon informed him, when there, that the nitrate of silver, according to my plan, was much used in the hospitals; and that he and another surgeon got into practice in Constantinople from their success in using it.

In the army and navy surgical departments, the nitrate of silver appears to have been found of the utmost advantage, from its obvious efficacy in preventing inflammation in contused, punctured, lacerated wounds, especially those of the bayonet, and inducing adhesive inflammation of incised and sabre wounds.

The nitrate of silver is so portable, and renders the multiplicity of dressings usually applied in many surgical cases so unnecessary, that it must be of great advantage in circumstances where it is important to be as little encumbered as possible with impedimenta.

The application of this remedy is in general, too, so simple, and its operations so prompt, that the period of residence in hospitals is, by this means, in many cases, very greatly shortened. The patient has sometimes been cured in five or six days, where, under ordinary treatment, the detention would have been as many weeks.

Another advantage of the nitrate of silver is, that

instead of daily dressings, required in many wounds, only a single application is necessary ; in ulcers, an attention to the patient every third or fourth day is all that is required. These advantages are very great in all hospital practice, but particularly to the class of out-patients, of whom the number is increased, whilst that of the in-patients is proportionably lessened by the practicability of treating many cases without rest, which cases would otherwise require long confinement to a bed or couch.

In what may be termed " Domestic Surgery," the nitrate of silver is now an important article, and, to a great extent, the stick of nitrate of silver is a household remedy, and has almost banished salves, ointment, plasters, and bandages.

From this simple method of treating wounds—leading to the abandonment of the old mode of treatment with unguents, plasters, and bandages—and necessarily involving exposure to the air, the nitrate of silver will be particularly valuable in preventing cutaneous inflammation in amputations, and also in removing the irritation arising from the lacerated edges of the wound in compound fractures ; the parts being kept in apposition by the interrupted suture, and the nitrate of silver on the skin surrounding, and on the exposed sore, forms an eschar, closing the parts firmly, and would generally be a sufficient protection. If strips of adhesive plaster were thought necessary, they would produce no irritation if applied where the nitrate of silver was used. The eschar from the

nitrate of silver excludes the atmospheric air from the wound, and so reduces the dangerous circumstances of a compound fracture to that of a simple fracture, the wound being healed by the first intention. The nitrate of silver, by subduing inflammation, has been found a valuable remedy in affections of the internal canals, in the urethra, vagina, the rectum, throat, &c. Mr. Jewel, Lecturer on Midwifery in London, informed me that he was led to publish his work on "Leucorrhœa" from the perusal of my Essay on the Nitrate of Silver.

In collieries, in factories, and wherever the persons employed are liable to contusions, superficial scalds and burns, or similar accidents, a remedy possessing the power of preventing inflammation, sloughing, and ulceration, has proved a valuable acquisition.

I may here mention the various impediments to the free use and general adoption of the nitrate of silver, which have been a source of continued trouble and annoyance to me ever since the second edition of my work. These have arisen from erroneous views, promulgated in medical and surgical manuals, by different lecturers and authors, totally at variance with the plain, common-sense directions and principles laid down in my work. Hence the conflicting opinions of the Profession.

The hindrances have been five-fold. First: the supposed caustic quality of the nitrate of silver. Second: the suspicion of its causing metastasis to internal organs. Third: the deviations from my

method of applying the nitrate of silver. Fourth: the varying strength of the solutions made use of. And fifth: the use of a new and worthless preparation of the nitrate of silver.

1. An early and great hindrance to the general use of the nitrate of silver was a prevailing and erroneous idea that it was a caustic in the usual acceptation of the term.

I think it needful to write very particularly on that subject, proving that it is not a caustic and destructive agent, but one possessing an extraordinary *preservative* property.

The nitrate of silver is not a caustic in any sense of the word. It subdues inflammation and induces resolution, and the healing process. It preserves rather than destroys the part to which it is applied, even where the skin would inevitably slough but for the extraordinary preservative power of this remedy.

If we compare a caustic, as the hydrate of potassa with the nitrate of silver, we find that the hydrate of potassa destroys, and induces a slough and the ulcerative process; but if we apply to a part the nitrate of silver, the eschar remains adherent for a time, and then falls off, leaving the subjacent parts healed. If an ulcerated surface, secreting pus, be passed over by the nitrate of silver, the purulent discharge is immediately converted into serum: it is the property of the hydrate of potassa, on the contrary, to induce ulceration and suppuration. In short, the peculiar properties of the nitrate of silver have long been concealed by its

being thought a caustic, a destructive agent, and being called Lunar Caustic, affording the most striking instance of the influence of a term or of a classification upon the human mind.

The nitrate of silver and the hydrate of potassa (as indeed all caustics) are as the poles to each other—the first *preserves*, the second *destroys*. The first induces cicatrization; the second ulceration.

It is rather singular that the caustic character of the nitrate of silver has been subjected to legal investigation.

In the year 1851, Mr. Christopher Rogerson, surgeon, of Blackburn, Lancashire, anticipated an assize trial as a felon, for having, as was supposed, indelibly branded a boy of the name of Wood with the mark B with the nitrate of silver.

This was intended as a punishment by Mr. R., for ringing at his door-bell, and then running away. Dr. J—— gave evidence for the complainant, and alleged that the imprint of the B will remain after the black mark has disappeared. A surgeon also stated that it might remain a year. This allegation was based on the opinion that the nitrate of silver is a caustic, and a corrosive substance. At the examination, Mr. Rogerson brought forward my published evidence that the nitrate of silver is not a caustic, and that after its application no permanent mark ever remained on the skin.

Mr. Rogerson congratulated me on my researches as to the nitrate of silver, and on having saved a brother

practitioner from the charge of felony, and an assize trial. It fortunately happened that while the trial was pending Mr. R. was treating a case of erysipelas in a young woman with a concentrated solution of the nitrate of silver, with the most signal success. The peeling off of the black cuticle, without leaving any mark, was witnessed by scores of people with great interest, on account of the legal prosecution.

2. The second hindrance, the metastasis, &c., will be found sufficiently treated upon in the chapter on Erysipelas.

3. The deviations from my method of applying the nitrate of silver are chiefly two. Keate adopted the method of applying the nitrate of silver over the skin where the inflammation ends. Liston and Sigmond, in their lectures, have directed "the nitrate of silver to be applied around the inflammation, as a barrier to prevent its spreading," leaving the inflamed surface untouched—a practice which seldom has the effect even of arresting the spread of inflammation, and leaving the inflamed surface to endanger deeper mischief. I will only state a single direction from one manual, to arrest the inflammation "by applying the nitrate of silver, so as to completely encircle the inflamed part."

The proper and simple direction I have given is:—To apply the nitrate of silver over the *whole* of the inflamed surface, and beyond it on the healthy skin; and should the inflammation still spread, to repeat the

application until it is quite subdued. This method of treatment has always been successful.

The other error is in applying the nitrate of silver on the inflamed surface only, neglecting to apply it on the surrounding healthy skin, or to re-apply it when the inflammation spreads. This will be best illustrated by a single case. A surgeon had severe erysipelas of the face and head, and was attended by several of his medical brethren. I was informed that the nitrate of silver had been applied. When I visited him he had violent delirium, causing him to become unmanageable. I observed the nitrate of silver had been applied on one side of his face, allowing the inflammation to spread over the remainder of the face and scalp, producing severe cerebral disturbance. By a proper and early application of the nitrate of silver, all the mischief would have been prevented.

The fourth is—The varying strength of the solutions made use of. Mr. Erasmus Wilson says, in his lectures in the *Lancet* of the 22nd of April, 1843, on diseases of the skin: "The nitrate of silver has been much praised as an application in erysipelas."

Mr. Higginbottom recommends its employment "in *weak* solution. The strength may vary from five to fifteen grains to the ounce of distilled water." I have never recommended or used a weak solution in external inflammation, but, as afterwards stated, a concentrated solution of one hundred and sixty grains to one ounce of distilled water.

Mr. Nunneley, in his monograph on erysipelas, has

fallen into the same error, recommending from eight to twelve grains of the nitrate of silver to one ounce of distilled water, or six or eight grains to the same quantity of rectified spirits. These weak solutions are inefficient to arrest the disease, but quite sufficient to bring the remedy into discredit.

The fifth is the use of a new and worthless preparation of the nitrate of silver. I published a paper on this subject in the *British Medical Journal*, of July 11th, 1863, as follows: It is very important to call the attention of surgeons to the superiority of the ordinary stick of the nitrate of silver over the new preparation, which has been now used for some time.

The new preparation, "Lunar Caustic points perfectly tough," is worthless as an application in surgical cases.

It is not nearly so soluble as the old brittle stick of nitrate of silver, and while possessing scarcely any power to check and subdue inflammation, is quite useless in the cure of wounds. The same remarks apply to the cake and crystals of the nitrate of silver, used for photographic purposes; which, although they may be chemically purer, are much less efficacious for surgical purposes than the old preparation.

The grounds on which I form my opinion are these: I have used the new preparations, and in cases where, from past experience, I looked forward with a certainty of successful results, I have been much disappointed, and the case was to me otherwise inexplicable.

The following cases are the result of the practice. A medical friend had a severe puncture. I applied the nitrate of silver with the conviction that he would have no further trouble. To my surprise the application took little or no effect; surrounding inflammation followed, and affected even the absorbents. Further applications were made with the same nitrate of silver, but the inflammation continued its usual course, keeping my patient several days in bed, and then but very slowly subsiding.

Another patient had a severe contused wound on the middle finger of the left hand, from a fall. The nitrate of silver was well applied. I expected it would heal under an adherent eschar—that it did not, surprised and disappointed me. The wound remained several weeks in a painful and irritable state, and when it at last healed, it left an irritable induration, with swelling. This I treated again and again with the nitrate of silver, without much benefit.

These and other cases I could relate (one especially, a formidable attack of erysipelas on the leg, which formerly I found yield to the application, entirely failed), led me to think there must be something wrong in the preparation of the nitrate of silver; and it occurred to me that the new preparation did not produce so much pain as the old did, immediately on its application, and was by no means so soluble. I procured some of the old-fashioned stick of the nitrate of silver. The first application, in the case above-mentioned, did more in removing the irritable in-

flamed swelling in four days, than all the former applications.

It will be observed that my medicinal treatment, in all cases given in my work, is very simple and strictly antiphlogistic; particular attention has been paid to the *primæ viæ*, as they are often, in such cases, in a bad state. I commence with an ipecacuanha emetic in the evening, a calomel pill at bed-time, and the following morning an aperient; and effervescent draughts to be continued a few days, and aperients when required afterwards.

I consider the ipecacuanha emetic essential, not only for removing any offending and irritating matter from the stomach, but as being a powerful remedy in combating inflammation. A full dose of half a drachm of the ipecacuanha, combined with ten grains of the bicarbonate of potash, answers admirably, as well as safely and quickly, in producing full vomiting.

Ipecacuanha has also the power of raising the system to its normal condition, without producing any unnatural excitement; the stimulus of vomiting rouses the sinking powers, by producing a considerable effect on the nervous system; it equalizes the circulation of the blood, and promotes the healthy secretions of the various organs. It is a desideratum, when persons have to take a disagreeable medicine, as an emetic, to know the best method of taking it, which I think is as follows: a pint of weak tea to be taken directly; in half an hour after, the emetic powder in a little cold water, and in a quarter of an hour or twenty

14 THE USE OF THE NITRATE OF SILVER.

minutes, drink freely of warm water, gruel, or weak tea.

It will be observed that I used venæsection in the early years of treating erysipelas, but for the last twenty or more, I have altogether desisted from the practice, and the cases have done equally well.

CHAPTER II.

OF THE PRINCIPLES OF THE TREATMENT BY THE
NITRATE OF SILVER.I. *Of the Nitrate of Silver as a Remedy in External
Inflammation.*

THE influence of this agent in subduing inflammatory action had not been noticed by surgical writers, nor had its unexpected and extraordinary powers in this respect been ascertained, until I called attention to it in the year 1829.

That the application of the nitrate of silver should fix and subdue the inflammation of phlegmon, or a line of inflamed absorbents, arrest the spreading of erysipelas, prevent and modify the formation of pus, subdue the action of specific inflammation of variola, and beneficially affect parts subjacent to those involved in morbid action, as of the brain in erysipelas of the head, is most extraordinary.

My own experience, and that of others, leads me to believe that the nitrate of silver is a safe and an effectual remedy for wounds met with whilst dissecting.

It has also been ascertained by Youatt, that the specific poison of hydrophobia is neutralised and rendered innocuous by the use of the nitrate of silver.

In primary syphilitic sores the treatment with the nitrate of silver is so well known, and generally accepted, as to require no comment on my part.

On the Method of using the Nitrate of Silver.

After so many years' additional experience in the use of the nitrate of silver, in the treatment of inflammation, wounds, and ulcers, I am anxious to give full and particular directions for its use; for the proper mode of applying this remedy is quite essential to secure its good effect.

There is no form of acute superficial inflammation, arising from constitutional or mechanical causes, in which the nitrate of silver may not be applied with great safety and advantage. For many years I have used the nitrate of silver, in solution, in proportion as follows, prepared immediately before using it.

R. Argenti nitratis, ℥iv.
Aquæ destillatæ, ℥iv.

I find the above concentrated solution more convenient for application when it has to be used on a considerable surface, as in erysipelas, &c. It may be applied with a small piece of linen, attached to a little stick. It is not only useful for external use, but for application to internal parts of the throat, &c. Precaution should be taken to renew the linen after it has once been used.

When the solid form of the nitrate of silver is used, it is necessary to moisten the surface to which it is to be applied slightly with pure water, and apply a long stick of the nitrate of silver *flat* upon the moistened surface, taking care that it be applied to every affected part.

It is necessary for the successful application of the nitrate of silver, that the surface of the skin be free from any oleaginous matter, loose cuticle, or any other extraneous substance. The parts should be well washed with soap and water, and afterwards with water alone, to remove any particle of soap remaining, as the soap would decompose the nitrate of silver.

It is very essential to know the precise effect of the nitrate of silver in the different degrees of its application.

In some cases of slight external inflammation, it is sufficient merely to blacken the cuticle. How this apparently simple process acts in subduing the inflammatory action, I am quite at a loss to determine. But it is my object simply to ascertain and state practical facts. It is plain, however, that a chemical union takes place between the metallic salt and the animal substance, by which its pores are obliterated, and the action of the external air excluded. In other cases, the nitrate of silver must be applied more or less freely, according to the degree of inflammation, as follows:—

The nitrate of silver, either in solution or the

stick, may be passed once, twice, thrice, or more times, according to the degree of inflammation; once in slight cases, twice or thrice in common cases, and more frequently on the spots where the inflammation is most intense. On these parts, I have applied the stick after the concentrated solution, so as to have the full effect of the remedy. It is necessary to apply the nitrate of silver more on the hand, or sole of the foot, where the cuticle is thick, than on other parts. After the application, the part is to be exposed to the air to dry, and is to be kept cool.

In twenty-four hours, if the nitrate of silver has been properly applied, it will be frequently observed that the inflammation has subsided, and its progress been checked; but if there be an inflamed spot left untouched, the patient will complain of it. To every such spot, the nitrate of silver must be applied. At this period, there is often a little vesication, which is to be disregarded.

On the third day, there is usually more vesication and less swelling, and the patient complains of a little pain, as of a blister; but on pressure, the part has a puffy feeling, and is found quite free from inflammation.

On the fourth day, the vesications begin to disappear. It is best to leave them undisturbed, for the dried exudation and cuticle defend the subjacent cutis.

On the fifth day, the vesicated crusts separate, leaving the subjacent parts free from soreness and

inflammation. It is sometimes several days before the whole of these crusts peel off; but it is best to leave them undisturbed.

II. *Of the Nitrate of Silver as a means of inducing the healing process or adhesive inflammation.*

I have observed that abscesses over which the nitrate of silver has been applied are left in a state more disposed to heal than similar abscesses, in the very same case, in which this remedy has not been used. It would, therefore, appear that the nitrate of silver modifies the action of the parts, so as to induce that form of inflammation which John Hunter has termed the adhesive.

This effect of the nitrate of silver is equally observed in recent wounds, whether incised, punctured, lacerated, or bruised. In large incised wounds, in which sutures are used, union by the first intention is frequently secured by the application of the nitrate of silver along the line of the wound, and on the surrounding skin.

In punctured wounds, union is promoted and supuration prevented. In bruised wounds, the action of the parts is so modified that their texture is often preserved unbroken, and sloughing, which would otherwise inevitably have taken place, is obviated. I have attended cases of lacerations and bruises, in which I anticipated loss of substance, particularly on the face; and in a few weeks after the treatment I

was agreeably surprised to find scarcely a mark of the wound visible.

I speak in general terms, merely wishing to state, in this place, the fact of this application of the nitrate of silver. The various limitations and exceptions of this statement will be pointed out hereafter. In the meantime, it must be confessed that this principle and these effects were equally new with those pointed out in the preceding section. The influence of the nitrate of silver in inducing adhesive inflammation is not less obvious in its application to ulcers.

In neglected punctured wounds, attended by ulceration, pain, swelling, and fungous growths—and in cases in which there would have been destruction of the parts, as in deep-seated inflammation of the fingers and the hand—the nitrate of silver has a most decided effect in checking the inflammation, in preventing that destruction of parts, and inducing the healing process.

In ulcers which are rapidly spreading, attended with severe and extensive inflammation, as in phagedæna, the nitrate of silver has an immediate effect in subduing the inflammation, and in inducing the healing process.

In those cases of inveterate and obstinate ulcers of the legs, which have been for years unhealed, attended by sleepless nights and painful days, the nitrate of silver, applied under particular regulations, has extraordinary powers in relieving pain, removing the fœtor, and inducing sleep, even from the first time of its

application; the ulcer has altogether a more healthy appearance, and is in a state better for the healing process.

The mode of applying the nitrate of silver is much the same in some of these cases as in external inflammation. But each particular case requires its peculiar mode of treatment; this will be best detailed in treating of each of these cases distinctly.

III. *Of the Nitrate of Silver as a means of healing by eschar.*

1. *Of the Adherent Eschar.*—It is a singular and interesting fact, that whenever an eschar made over the surface of a wound or ulcer can be preserved adherent, such wound or ulcer infallibly heals.

It appears scarcely necessary to describe the immediate and well-known effects of the application of the nitrate of silver to the surface of a wound or ulcer. It may, however, be shortly observed, that it induces at first a white film, which, when exposed to the air, assumes in a few hours a darker colour, and at a later period becomes of a dark grey or black. As the eschar undergoes these changes of colour, it gradually becomes harder, and resembles black sticking-plaster. In the course of a few days, according to the size and state of the wound, the eschar becomes corrugated, and begins to separate at its edges, until at length it peels off altogether, leaving the surface of the sore underneath in a healed state.

In the formation of this eschar, several things require particular attention. The application of the nitrate of silver should be made not only over the whole surface of the wound, but also upon the surrounding skin; for the eschar, in drying, is apt to contract a little, and in this manner might leave a space between its edges and that of the adjacent healthy cutis.

It is sufficient to apply the nitrate of silver on the wound lightly, so as to cover every part of it; and if there be any surrounding inflammation, the skin should be moistened with a little soft water, and the nitrate of silver passed once lightly upon it.

The importance of avoiding all causes which might detach the edges of the eschar, will be at once apprehended by the interesting observation already mentioned, and which I have deduced from very extensive trials; that in every instance in which the eschar remains adherent from the first application, the wound or ulcer over which it is formed invariably heals.

Not only the cause just mentioned, but every other circumstance by which the eschar might be disturbed, must therefore be carefully avoided, and especially as the eschar begins to separate from the healed edges of the wound, it should be carefully removed by a pair of scissors.

To the surface of the wound the eschar supplies a complete protection and defence, and allows the healing process to go on underneath, uninterruptedly and undisturbed. It renders all applications, such as oint-

ments, plasters, and bandages totally unnecessary, as well as the repeated dressings to which recourse is usually had in such cases; and it at once removes the soreness necessarily attendant on an ulcerated surface being exposed to the open air. In many cases, too, in which the patients are usually rendered incapable of following their wonted avocations, this mode of treatment saves them from an inconvenience which, to some, is of no trifling nature.

It has been already stated how important it is that the eschar should be preserved adherent. To secure this still more effectually, I have found it of great utility to protect it by a piece of gold-beater's skin. The skin surrounding the wound is simply moistened with a drop of water, and the gold-beater's skin is then to be applied over it, and over the eschar, to which it soon adheres firmly, but from which it may be removed at any time, by again moistening it for a moment with water; the same piece of gold-beater's skin admits of being again and again re-applied in the same manner. In wounds of the face, after using the nitrate of silver, I should prefer exposing the parts to the air to applying the gold-beater's skin, it being simply a protection to those parts which are obliged to be covered. In this manner, in cases in which there would be much and long-continued irritation and pain, as in superficial wounds along the shin, all this suffering, and its consequences in disabling the patient, are completely avoided. A blush of inflammation forms round the eschar, but this gradually

subsides without any disagreeable consequences, and the inflammation which would otherwise be set up, is entirely prevented by the due formation of the eschar. In my earlier experiments I often observed this fact, but since that time I have always applied the nitrate of silver on the surrounding healthy skin, and beyond any inflammation which might be present, or which might supervene.

I may notice in this place, some observations on the comparative effects of healing by eschar and scabbing. On the subject of scabbing, I must refer my reader to the well-known work of John Hunter, on "The Blood." The advantage of healing by eschar over that by scabbing is quite decided.

By comparative trials, I have found that whilst the scab is irritable and painful, and surrounded by a ring of inflammation, the adherent eschar becomes totally free from pain and inflammation, and that whilst the scab remains attended by inflammation, and unhealed, the eschar is gradually separating, leaving the surface underneath completely cicatrized. To these observations I may add, that the success of the plan of healing by eschar is infinitely more certain, as well as more speedy, than that by scabbing.

I shall, in conclusion, briefly recapitulate the advantages of this mode of treatment. In the first place, it is, I have no doubt, far more efficacious and speedy than any other; secondly, it has the great advantage of saving the patient much suffering and inconvenience; and thirdly, it renders the repeated

application of dressings and ointment quite unnecessary. Its utility is extremely great therefore, where the time of the poor, the expense of an establishment, and the labours of the medical officer, as well as the sufferings of the patient, require to be considered ; in all these respects it has been found of the greatest advantage and value.

2. *Of the Unadherent Eschar.*—The eschar is generally adherent in cases of recent injuries, and very small ulcers, attended by little inflammation. In other cases the eschar is too apt to be unadherent, and this arises from the formation of pus, or a scab underneath.

If the eschar be unadherent by the formation of pus, it may be ascertained in twenty-four hours, by making a small incision into the centre of the eschar with any sharp-pointed instrument ; this will give no pain ; the fluid is to be gently pressed out, and the nitrate of silver is then to be applied to the orifice thus made, which should be defended by gold-beater's skin. This practice frequently answers well in small ulcers, where it may only be needful to evacuate the fluid once a day for several times ; but should it not then become adherent, it is best to apply a bread-and-water poultice, to remove the eschar, and afterwards to treat it as a large ulcer, with the nitrate of silver, lint, and neutral ointment.

3. *Of the Eschar and Poultice.*—In some cases there is no chance of effecting an adherent, or even an unadherent eschar. The size or situation of the

wound or ulcer may preclude the possibility of this. In such a case, the cure may often be effected by first applying the nitrate of silver, and then a bread-and-water poultice, from day to day, according to circumstances, until at length, by the subsidence of the inflammation, and the cicatrization of the ulcerated surface, the case may often admit of an adherent eschar; if not, it must be treated with the black lint and neutral ointment (vide formulæ on the last page). This plan is particularly useful in cases of neglected punctured wounds, attended by ulceration, pain, and swelling, and in cases of recently opened abscesses. By this mode of treatment, the pain and swelling are much subdued, and a free issue secured for the secreted fluid, and in no case have I seen the original inflammation increased.

I have seen many cases in which, by this mode of treatment, much suffering, and perhaps the loss of some of the smaller joints, have been prevented in deep-seated inflammation of the fingers, which, having been neglected, have issued in severe inflammation and fungous growths. In these cases, it is not only necessary to apply the nitrate of silver to the surface of the sore, but in every cavity or orifice which may be formed by the disease, and also on the surrounding inflamed skin, repeating the application as may be necessary.

CHAPTER III.

OF THE USE OF THE NITRATE OF SILVER IN THE
TREATMENT OF EXTERNAL INFLAMMATIONS.I. *Of Phlegmonous Inflammation.*

PURE phlegmonous inflammation may be often arrested and subdued by an early application of the nitrate of silver, without any other remedy; but if it has proceeded so far as to be doubtful whether suppuration has taken place or not, the inflammation will be arrested, and the suppuration rendered more circumscribed and limited in its extent.

If the tumefaction and inflammation are not subdued in four days after the application of the nitrate of silver, it will be found that suppuration has taken place, and that the use of the lancet will be required to open the abscess, after which the wound will more rapidly heal than if the nitrate of silver had not been used. The cold poultice may be applied every eight hours, and the nitrate of silver every second or third day.

The effects of the nitrate of silver in the treatment of phlegmonous inflammation will be best understood by reading short details of individual cases. I shall

therefore proceed to give such a selection of these as appears to me best calculated to elucidate this subject:—

CASE 1.—Miss —, aged fourteen, was brought to me with considerable swelling, hardness, and redness of the skin, situated in the ham, and extending along the back part of the thigh and calf of the leg. It had been spreading for several days. No cause could be assigned for this affection. The patient was feverish, and complained of feeling generally indisposed. I applied the nitrate of silver over the whole inflamed surface, and directed it to be kept without any covering. I ordered her no medicine.

Not knowing the address of my patient, I was three days before I heard of her again. She was then nearly well, and there was no vestige of inflammation or swelling. A slight vesication had appeared on the day after the application of the nitrate of silver, for which a simple ointment had been applied.

The eschar was separating in some parts, leaving the surface of the skin white. My patient had complained of no pain from the applications, but had experienced some heat from the vesications.

In five days the cuticle had nearly all separated, and the patient was quite well.

CASE 2.—A servant girl, aged sixteen, applied to me with inflammation extending over the forepart of her knee, for which no cause could be assigned, except kneeling, for washing floors.

There were much pain and swelling, and the skin was exceedingly tender, and hard to the touch. The pulse was very frequent, and the patient was feverish, and complained of being indisposed. She kept her bed. I prescribed an emetic and purgative medicine, and applied the nitrate of silver all over, and a little beyond, the inflamed surface. Two days afterwards, the swelling had much subsided, and the tenderness was entirely gone. Some vesication existed on the inside of the knee; but over the forepart of the knee, where there was most inflammation, vesication had not taken place. The case gave no further trouble, but got well in a few days.

Similar cases, under ordinary treatment, have continued for many days, or even weeks, attended with much inflammation, and sometimes even suppuration.

CASE 3.—Mrs. C——, aged thirty-nine, was seized with acute pain on the back of the forearm, above the wrist. It appeared to be deep-seated, and was attended with considerable swelling halfway up the arm, and on the back of the hand, but with no redness. No cause could be assigned for it. She felt generally unwell.

I prescribed an emetic and purgative medicine, and applied the nitrate of silver to the whole of the swollen surface. This had the effect of affording great relief. The swelling appeared to be subsiding for several days, after which time the pain and swelling increased again about the spot where she had the first attack; and on examination, I could

feel a distinct fluctuation. I opened the part with a lancet, and some pus was evacuated. I applied the nitrate of silver within the cavity, and prescribed a cold poultice. In a few days, my patient was quite well.

CASE 4.—Miss —, aged twenty-one, of gross habit, was seized on Saturday with acute pain across the patella, whilst sitting at dinner, without any previous known cause. On walking a short distance, she found that she was lame, and that her knee was stiff. Half an hour afterwards, the knee was observed to be swelled, but there was no redness. A poultice was applied. In a few hours more, inflammation was observed to be spreading up the thigh. The poultice was taken off, and soap liniment was applied.

On the following morning, the poultice was applied, and it was continued all day, and until Monday, when I saw her. The inflammation had spread along a third part of the length of the thigh, and downwards, nearly to the ankle. The limb was much swollen, exceedingly hot, and a slight fluctuation was felt just below the patella. I applied the nitrate of silver over the whole surface of the inflamed parts, and did not open the abscess, as I knew from experience that the tumour would subside rather than increase, soon after the application of the remedy. I directed an emetic and a purgative medicine, and desired a fracture cradle to be put over the limb, which was to be kept exposed.

On Tuesday, the inflammation was quite arrested,

and there was no heat. I opened the abscess below the knee with a lancet, and some fluid was evacuated, which had more a serous than a purulent appearance.

I applied the nitrate of silver within the cavity of the abscess. A poultice was applied. On the following day there was an increase of inflammation below the eschared part, on the foot, attended with swelling. I applied the nitrate of silver on that part, and directed an aperient medicine.

On the next day all inflammation was gone, but the limb was still much swollen.

On the succeeding Monday the swelling of the limb was much subdued, and there was very little complaint. I directed a repetition of the aperient medicine.

On Wednesday the patient was convalescent. The leg required a bandage till the swelling was gone.

II. *Of Erysipelas.*

Directly after the publication of my first edition, I was induced to try the application of the nitrate of silver in erysipelas, probably from having often seen the subsidence of inflammation around wounds and ulcers healed with it.

The first case in which I used this remedy upon the face, was that of a young woman affected with erysipelas, covering nearly the whole face like a small mask in the shape of a heart, but leaving a border of

nearly two inches around it free from inflammation.

I wished in this case to try the effects of a partial application of the nitrate of silver. It was accordingly applied within the inflamed border for about an inch in width, and in the same manner over the adjacent healthy skin on one side of the face, thus making an eschared surface four inches long and two broad.

This treatment had the remarkable effect of entirely subduing the inflammation and checking its progress on that side. The inflammation spread rapidly on the other side over the whole scalp and neck, and surrounded the eschared surface in every direction, without at all affecting a single point of the healthy skin to which the nitrate of silver had been applied.

The disease ran its usual course with severity, with occasional delirium for five or six days, although every mode of treatment then used in similar cases was employed, viz. venesection, blistering the nape of the neck, purgative and saline medicines. Having observed in this case the decided effects of the nitrate of silver in subduing inflammation and preventing its progress, and that in five days the eschar was peeling off, leaving the subjacent skin white and free from inflammation and swelling, I was led to think that if it were applied in such cases on the whole inflamed surface, and on the surrounding healthy skin, it might effectually check the disease in the commencement, and prevent in a great measure the severe and con-

stitutional affection which follows. In this I was not disappointed.

In the next case met with, the local affection was quickly destroyed by the nitrate of silver; the constitutional affection ceased directly, and the patient became convalescent in a little more than half the time occupied by the usual course of the disease, and this attack was cured before that period at which it usually becomes most dangerous.

The value of the nitrate of silver in addition to the general treatment in severe cases of erysipelas, I have now fully proved by long experience.

The mode of applying it is as follows, which I have in part previously stated:—The affected part should be washed well with soap and water, then with water alone to remove every particle of soap, as the soap would decompose the nitrate of silver, then to be wiped dry with a soft cloth. The *concentrated* solution of the nitrate of silver is then to be applied two or three times on the whole of the inflamed surface, and *beyond it*, on the surrounding healthy skin, to the extent of two or three inches. The solution may be applied with a small piece of clean linen attached to the end of a short stick: the linen to be renewed at every subsequent application.

As the solution of the nitrate of silver is colourless, it is necessary to pass a little linen, just moistened, over every part where it has been used, in order to be equally diffused, so that no spot be left untouched.

In about twelve hours it will be seen whether the solution has been well applied. If any inflamed part be unaffected, the solution must be immediately re-applied. Sometimes even after the most decided application of the nitrate of silver, the inflammation may spread; but it is then generally much less severe, and is eventually checked by repeated application.

It is desirable to visit the patient every twelve hours until the inflammation is subdued.

By these means we have complete control over the disease. If the disease be attended by vesication, the vesicles should be broken, and the solution of the nitrate of silver applied *once slightly* on the denuded parts; but if the vesicles arise from the use of the nitrate of silver, they should be allowed to remain undisturbed, except when the cuticle is hard, as on the hands and soles of the feet.

In erysipelas of the face, when it is spreading on the forehead, or at all on the scalp, the whole of the head should be shaved as early as possible that the extent of inflammation on the scalp may be clearly traced. This can often only be detected by pain, or by œdema being felt on pressure with the finger. The solution requires to be applied very freely all over the scalp, where it scarcely or never produces vesication.

When the inflammation has been subdued by an early use of the nitrate of silver, the constitutional symptoms immediately cease. They are always aggravated by the least increase of local inflammation.

Simple Acute Erysipelas, a Local, not a Constitutional Disease.

For many years past I have considered simple acute erysipelas a purely local disease, and one which ought not to be classed among the exanthemata or constitutional diseases, as the constitutional derangement alone arises from local disturbance. I believe the arrest and subjugation of the erysipelas by application of nitrate of silver, prove it to be a *local* and not a *constitutional* disease. This opinion is based upon the following facts:—

1. I have attended a number of cases of erysipelas on the face and elsewhere at the early stage of the disease, where there have been no constitutional symptoms, and in these the disease has been directly arrested and subdued by the application of the nitrate of silver. If the erysipelas had been allowed to proceed without the local application, constitutional disturbance would have been the result.

2. If from exposure to wet or cold a feverish attack takes place, and in several days erysipelatous inflammation supervenes, on a prompt application of the nitrate of silver, in connexion with the usual remedies for the cold, the patient becomes convalescent in a few days; but if the local application is neglected, the inflammation runs its usual course, the constitutional symptoms become more aggravated, and the illness is much prolonged.

3. If the erysipelas and constitutional symptoms

appear simultaneously, a prompt application of the nitrate of silver at an early stage of the complaint, and the use of active constitutional remedies, cut short the disease. The patient is soon convalescent; but if the local disturbance is neglected, the disease runs its usual and often destructive course, setting at defiance the most active constitutional treatment.

An erroneous objection *was once raised* against the use of the nitrate of silver in erysipelas. Being classed with the exanthemata, or constitution diseases, it was feared that the application of the salt might cause metastasis, or a determination of the inflammation to internal organs. I have never entertained such an opinion, nor have I, during more than forty years' experience, seen a single instance, either in erysipelas or any other inflammation, where the application has produced any untoward effects.

For some years I used the solid stick of the nitrate of silver in erysipelas by slightly moistening the surface of the skin with *pure* water, and applying a long stick of the salt flat upon the moistened surface, taking care that it was applied to every affected part, and on the surrounding healthy skin. *The ordinary brittle stick*, being so very soluble, effectually answered the purpose.

For many years I have used, for the same purpose, a solution of the nitrate of silver, in the proportion of four scruples to four drachms of distilled water, as previously stated, finding the concentrated solution more convenient for application when it is applied on a considerable surface, as in erysipelas, &c. It may

appear to some a very strong solution, but it is always very manageable and safe, and can be applied in any degree required, by passing it on the surface once, twice, or thrice, or more, according to the degree of inflammation. I never knew it to destroy the *cutis vera*, or do the least injury.

From mature and long experience of erysipelas, I would apply the nitrate of silver on the first appearance of the inflammation, and not run the risk of an hour's delay. If the application were even unnecessary, the only inconvenience would be a blackened skin for a few days—a matter of no consequence compared with the injury which might be caused by the spreading of the inflammation. The well-known quotation is very applicable—“*principiis obstu.*”

CASE 5.—Ann Ward, aged forty-seven, single, and of a delicate habit of body. The catamenia had ceased for three months for the first time, and she had been indisposed for several weeks with a cold and cough, when she was seized two or three days ago with violent shivering, succeeded by heat and pain of the head, and soon after the right side of the nose, and the integuments near the right eye became affected with erysipelatous inflammation, for which she took an emetic and purgative.

The erysipelas had been increasing for two days when I saw her. It had spread over the whole of the right side of the face and ear, and over more than one half of the scalp.

She complained of violent pain of the head, which

was much increased by the severity of her cough ; the tongue was white and loaded, the skin hot and dry, the pulse 130. She was delirious during the night, and very restless. I took about fourteen ounces of blood from the arm, and prescribed a dose of calomel and a purgative with infusion of senna with salts. I ordered that the head should be shaved, and the head and face washed with soap and water. I then moistened every part of the inflamed surface, and passed a long stick of the nitrate of silver in a flat direction, over the whole inflamed surface, and a little beyond it on the surrounding healthy skin, leaving no part untouched.

On my visit the following day, I found the nitrate of silver had so checked the inflammation on the face, as to completely prevent its spreading to the other side of the nose. I found that some part of the scalp beyond the parts to which the nitrate of silver had been applied had an œdematous feel, although these parts were free from redness. I immediately applied the nitrate of silver freely over them, and over the whole scalp, as well as round the left ear, which had not been affected with the inflammation. The patient said the head had a benumbed feel, but was much less painful.

There was scarcely any vesication occasioned by the nitrate of silver on the inflamed parts, but on the surrounding skin, where it was applied, there was rather more. The patient was delirious in the night, but had been quite collected during the day ; the pulse was 104, the tongue rather cleaner, there was

less fever, and the bowels had been moved freely. On the second day there was no increase of inflammation; the left ear was not in the least affected, there was a little swelling of the eyelid on the left side. My patient was better in every respect. There had been a little delirium in the night, the pulse was 100. The purging medicine was directed to be continued.

On the third day after the first application of the nitrate of silver, there was no appearance of inflammation: there had been no delirium during the night, but a free perspiration with less fever, and the bowels were open. The slight vesications which had appeared were gone, and the eschars were adherent.

On the fourth day the eschars were separating, leaving the skin underneath free from erysipelas.

There had been no pain, only a little stiffness; the pulse was 92, the tongue rather loaded. There had been more sleep and no delirium for two nights, there was no fixed pain of the head, and the cough was not quite so troublesome, the appetite a little better.

On the sixth day the pulse was 88, the skin was cool, the bowels open, and the patient was in every respect much better; and from this period might be considered convalescent.

This being the first case of applying the nitrate of silver, after the experiment of a partial application on the young woman before mentioned, I was much gratified with the result of the treatment. It will be perceived that there was no delirium after the external erysipelas was subdued by the nitrate of silver (which

was effected on the third day), and the patient was convalescent in a little more than half the time occupied by the usual course of this disease, and consequently before that period in which it becomes most dangerous.

CASE 6.—March, 1827. Miss Wells, aged twenty, has for several days felt generally indisposed, with loss of appetite, debility, and drowsiness. During the last night she was very restless, and this morning she had considerable heat of the skin, with shivering at intervals; and this has been succeeded by an erysipelatous inflammation on the nose and left eyelid. The case being slight, I did not apply the nitrate of silver, expecting it would give way to the antiphlogistic treatment. I took about fourteen ounces of blood from the arm, and this caused her to faint. I prescribed an emetic and some infusion of senna with salts.

The inflammation spread very little during the day. On the next day I learnt that she had passed a restless night; her face was very hot and painful, and the pain in her head was violent; there was fever attended with shivering—the inflammation had spread a little on the right side of the face. The purging medicine was continued. In the evening the erysipelas had spread over the whole face, some vesications had formed on the right cheek, and there was an increase of constitutional symptoms; the pulse was 112. I applied the nitrate of silver, as in the former case, upon and beyond the inflamed surface. The pain given by the application of the nitrate of silver was severe, and

compared by the patient to a scald; it continued for two hours, and in a less degree during the night. The pain of the head, however, gradually abated.

On the following morning there was no increase of inflammation; there was still a little headache, the pulse was 96, there had been a little perspiration, the bowels were open.

In the evening I applied the nitrate of silver to several parts which appeared a little inflamed. The next morning the patient had more headache, the pulse was 92, and on examination I found that the inflammation had spread over the scalp, there being a slight degree of redness, and beyond it an œdematous feel. I ordered the head to be shaved, and afterwards applied the nitrate of silver on the greater part of the scalp. In the evening there was no appearance of inflammation, the patient had experienced very sensible relief from the application of the nitrate of silver; in one hour afterwards, indeed, the pain in the head had quite ceased, and she had no return of it.

The following morning my patient was in all respects better; the pulse was 80. I applied the nitrate of silver on the remaining part of the scalp, although there was no appearance of erysipelas; for, as the disease is obscure on the scalp in the commencement, and sometimes cannot be ascertained except by the œdematous feel, or by the sensation of pain to the patient when pressed upon by the finger, I would advise the whole scalp to be escharred, if *any* part of it be inflamed.

The pain from the application of the nitrate of silver to the scalp is much less than that arising from its application to other parts; and the immediate benefit in relieving the pain of the head, by destroying the inflammatory action, is very apparent.

On the fourth morning after the application of the nitrate of silver, the pulse was 80; the catamenia appeared; the patient felt rather low, with a little hysterical affection and delirium.

On the fifth morning, the cuticle was separating, and the patient was convalescent. The opening medicine was directed to be continued.

On the tenth day, most of the eschars had separated from the face, leaving it in its natural state.

In the last case, the usual delirium appeared to be decidedly prevented by the prompt application of the nitrate of silver to the scalp; the ears and the chin were also kept from the slightest affection, and the patient might be considered convalescent even on the fifth day. I had therefore much satisfaction in observing the certainty and regularity of the effects of the remedy in this interesting case.

CASE 7.—August 6th, 1844, I visited Miss B—, 20 years of age, of very delicate constitution, and of a strumous diathesis. She had been exposed to the rain, and had neglected to change her clothes. She experienced the common symptoms attending a cold, accompanied by a slight erysipelatous inflammation of the right side of the cheek and nose. The constitutional symptoms were so slight, and the pulse so little accelerated, that I wished to avoid the applica-

tion of the nitrate of silver, thinking the inflammation might be subdued by other remedies. I directed thirty grains of ipecacuanha as an emetic, and in three hours after its operation two pills containing three grains of calomel and eight grains of the compound extract of colocynth, followed by a purgative of salts and senna, repeated every three hours till it operated freely.

7th. Very early the following morning, although the emetic and purgative had operated satisfactorily, she was labouring under a severe attack of fever, the pulse was 140, and the erysipelas had spread considerably on her face and forehead, and slightly on her scalp. I opened a vein in the arm, and bled her in the semi-recumbent position to the amount of twelve ounces, when she became faint. Her head being shaved, the concentrated solution was applied upon, and beyond, the whole of the inflamed surface, and also around the ears, to prevent their becoming inflamed. I applied it very freely over one half of the scalp, thinking that might be sufficient, as only a small portion of the forehead was affected. I prescribed two grains of the chloride of mercury, with two of James's powder, every six hours. There appeared no increase of inflammation on the 8th, and the pulse was 120; the bowels had been well moved. On the 9th she had a restless, feverish night, attended with slight delirium, the pulse being 120. There was no increase of erysipelas on the face, but it was spreading on the remaining part of the scalp. I applied the solution of the nitrate of silver over the

remaining part of the scalp. Neither of the ears was in the least affected. The solution of the nitrate of silver had formed a barrier beyond which the erysipelas did not spread. On the 10th, the patient was in every respect improving, and from this time recovered without interruption.

CASE 8.—I visited Miss H——, aged 30 years, on the evening of the 8th of December, 1843. She had been indisposed several weeks. There was considerable fever, quick pulse, and pain of the head, and she had a patch of erysipelas on the upper part of the nose and a little across the lower part of the forehead. I prescribed an emetic of ipecacuanha, followed by a dose of calomel and compound extract of colocynth, and the sulphate of magnesia in infusion of senna.

On the morning of the 19th, the erysipelas had spread all over the face, and as high as the forehead, close to the scalp, and there was no abatement of the constitutional symptoms. Having bled her, whilst sitting up in bed, until she fainted, I directed the head to be shaved, and then applied the solution of the nitrate of silver all over the face, and one half of the scalp.

In the evening I applied the solution of the nitrate of silver over the remaining part of the scalp, having found that one ear had been inflamed. I applied the solution both upon it and around the other ear.

20th. The fever was considerably abated, the pulse was 100. From this day the patient was convalescent.

CASE 9.—On the 14th September, 1844, I visited

Miss C——, aged 20 years. She had the day before a sense of coldness and pain in the limbs, and had then a slight degree of erysipelas on the left side of the nose, cheek, and upper lip. I prescribed an emetic and pill, with the compound colocynth extract and calomel, followed by an active dose of infusion of senna and sulphate of magnesia.

In the evening I found the erysipelas increased, and spreading towards the ear; the lower eyelid was considerably swollen, but the erysipelas had not reached the forehead; pulse 100, no pain of the head. I applied the strong solution of the nitrate of silver all over the inflamed surface, and the surrounding healthy skin for several inches, particularly round the ear. A grain and a half of calomel, with two grains of James's powder, were given every six hours, and a saline effervescing medicine every three hours.

16th.—The application had been effectual, and there was no increase of the erysipelas; the pulse was 80.

CASE 10.—Mr. J. S——, aged 30 years, had slight febrile symptoms on the 11th of December, which arose from exposure to cold. He had taken aperients and saline medicines. Two days afterwards there was a patch of erysipelatous inflammation on the right side of the face, without any considerable increase of fever.

The nitrate of silver was well applied on the inflamed part, and on the surrounding skin. There was no further extension of the erysipelas.

It will be observed in the last three cases, when the nitrate of silver was promptly applied, before the

erysipelas had produced severe constitutional symptoms, that the progress of the disease was instantly arrested, and that the patient speedily recovered. In the case of Miss H——, although the erysipelas at first was suffered to proceed, the application of the nitrate of silver to the whole scalp prevented any cerebral affection, and the patient was convalescent in a short time. In the first cases related, there was restlessness, attended with slight delirium, fifteen hours after the application of the nitrate of silver, but it was observed that the scalp, where the nitrate of silver had not been applied, was inflamed, and on the decided application of the nitrate of silver to the whole of the scalp the delirium ceased. From these cases, as well as from my experience of many years, I have come to the conclusion that the speedy application of the nitrate of silver will arrest the progress of erysipelas, and prevent cerebral mischief. It is also of great practical importance to subdue erysipelatous inflammation in its commencement, for I have observed, when the attacks have been severe, that the patients afterwards became more subject to a recurrence of the disease.

The following case will show the advantage of an early application of the nitrate of silver :

CASE 11.—Mrs. S——, several years since, had a severe attack of erysipelas, which ran its usual course under medical treatment. The effect of the disease had been so severe as to confine her to her bed-room for six weeks.

In November, 1845, she had another attack of erysipelas on the face. It had progressed twenty-four hours before I saw her. A decided application of the nitrate of silver was made on the parts affected, and purgatives were given. She was convalescent in seven days.

The following year, in October, it made its appearance again on the face. She had taken a purgative before I saw her. One decided application of the nitrate of silver was sufficient to check the disease, and she was not confined a single day. No further remedies were required.

During an epidemic of erysipelas, which occurred in the autumn of 1852, in Nottingham, I selected six cases, in four of which the nitrate of silver was applied, and two in which it was omitted, showing the contrast between the new and old treatment.

CASE 12.—Mr. M——, a railway clerk, aged 26, had erysipelas on the left side of the face, not reaching the scalp. He was slightly indisposed. One decided application of the nitrate of silver was alone required. He took an ipecacuanha emetic, followed by a calomel pill, and purgative draught, and also a saline mixture. He only required visiting four days.

CASE 13.—Mr. F——, a farmer, about 50, a free-liver, called at my house to consult me, having an erysipelatous inflammation of the right side of the face and the ear. It was spreading near the scalp. He was so little indisposed as to be able to ride five miles on horseback to visit me. I applied directly,

and very freely, the nitrate of silver to the inflamed parts, and close to the scalp, also on and beyond the inflamed ear, much fearing that the scalp would become affected. I thought proper to prescribe for him an emetic of ipecacuanha, a calomel and colocynth pill at bed time, and in the morning an active purgative mixture, to be repeated every three hours, if required. He returned home on horseback, and I heard nothing more of him for a week, when he sent for a repetition of the purgative mixture, with a message that the inflammation was quite gone.

CASES 14 and 15.—In October, 1852, two sisters, between twenty and thirty years of age, living together in the same house, had erysipelas. The eldest had been indisposed several days before I saw her, and the disease was attended with much constitutional disturbance, the erysipelas having partially affected the scalp. I thought it necessary to have the whole head shaved (although it caused considerable pain to the inflamed part of the scalp), so that I might apply the solution of the nitrate of silver very freely to the whole scalp. The usual constitutional remedies were used. In this case the recovery was more tardy, on account of the application of the nitrate of silver having been so long delayed. *A troublesome inflammation of the eye was produced, by the neglect of applying the nitrate of silver on the inflamed eyelids, which should always be attended to, in order to prevent inflammation of the conjunctiva.*

The younger sister, disliking the application of the

nitrate of silver, was desirous of taking an emetic and purgative to check the inflammation, but finding the erysipelas to come near the scalp, and fearing the loss of her hair, she submitted to a very free application of the nitrate of silver, which subdued the inflammation, and she was very glad that her hair was preserved.

In the two following cases the nitrate of silver was not applied :

CASE 16.—Mr. G——, of a gross habit, but not an intemperate man, had, in October, suffered from a catarrh, and felt generally indisposed. There was a slight blush of erysipelas on the left side of the face, but not sufficient to excite any particular attention. Constitutional remedies were resorted to, but no local application to the erysipelas was used. The inflammation progressed over the scalp, and produced cerebral disturbance, which, however, was not severe; the throat and mucous membrane of the larynx became inflamed; the irritation and the cough increased; the constitutional symptoms were now very severe; the mucous membranes, generally, were affected; he had severe pains and inflammation in his joints (similar to rheumatism), and the secretions were diminished in quantity, and in a vitiated state. A generally bad state of body was induced, and, after suffering a number of weeks, he died.

In this case all the severe symptoms followed the increase of the erysipelatous inflammation, and I think would have been prevented by a prompt application of the nitrate of silver.

CASE 17.—In November, Miss J——, aged thirty-five, was attacked with a slight erysipelas on the left side of the cheek and nose. No external application was used. An emetic, active purgative, saline draughts, and repeated doses of calomel and James's powder were given. The erysipelas progressed over the scalp, down the neck, and a little on the chest. A continued and severe indisposition was the consequence, attended with cerebral disturbance, producing delirium for some days, for which blisters were applied to the nape of the neck. Several large abscesses were formed on the neck and chest, the last of which was opened in eight weeks from the commencement of the erysipelas.

The above two cases were the only ones I attended, for nearly forty years, in which I did not apply the nitrate of silver, and the neglect arose from the insidious progress and the rapid advancement of the disease. Both were mild in the commencement. The result showed the necessity of a prompt and decided application of the nitrate of silver, even in the slightest attacks of erysipelas, to prevent evil consequences. In the last case, all the severe illness would have been prevented by a timely application of the nitrate of silver. I do not say it *might* have been prevented, for the continued experience of so many years has assured me of the practical truth, that it *would* have been prevented. I have had no case of simple acute erysipelas where acute abscesses have formed when the nitrate of silver has been early and well applied.

CASE 18.—The last case of erysipelas of the face

and head I shall give was to myself of particular interest, and I think may ultimately lead to a principle of great importance. It occurred in an elderly female, labouring under typhoid fever, and who suffered from cerebral symptoms before the erysipelas appeared. The application of the nitrate of silver had not the least control in arresting the progress of the inflammation; and from its failure in this case, I was led to think that the inflammation originated in the membranes of the brain, and spread thence to the scalp. The patient was reduced to a state of the utmost debility, attended with involuntary evacuations and retention of the urine, from which she ultimately recovered. From the successful issue of the case, I was led to think, although the nitrate of silver had no control in preventing the progress of the inflammation, yet its application on the inflamed scalp might in some degree relieve the inflammation of the membranes of the brain.

From the results of the above, I should be induced to apply a very free and decided application of nitrate of silver, instead of a cantharides blister, in some severe affections of the head, where instant relief might be obtained. I have seen such relief afforded by saturating a towel with boiling water, and placing it immediately on the scalp, previously pressing out the superfluous water to prevent its running down the face.

There was a fatal epidemic of erysipelas in Nottingham in the year 1825, two years before the intro-

duction of the nitrate of silver as a remedy. In the months of April, May, and June, a number of deaths occurred, and amongst them were those of a surgeon in the prime of life, and his sister. Dr. Storer, F.R.S., of Nottingham, a well-known physician, was the principal medical attendant on the patients during that epidemic.

In 1827, Dr. S., at my request, visited some of my early patients with erysipelas, whom I treated with the application of the nitrate of silver. He expressed his surprise and satisfaction with the successful result of the practice. I was much gratified with his testimony, as those who best knew Dr. S. were well acquainted with his extreme accuracy in observing facts, and caution in admitting them. He also referred to the late epidemic of 1825, and said if the remedy had been then known, a number of lives would have been saved.

CASE 19.—Sarah Siddons, aged sixteen, has complained of pain in her legs for several weeks, and for the last ten days felt low and chilly at times. This morning, Wednesday, the 7th of March, she was seized with an increase of pain in her foot, and on examination I found vesication, with surrounding inflammation of one toe. This inflammation spread during the day, over the instep, which was considerably swollen and tense, and on the leg extending to the calf; the inflamed surfaces had a bright red appearance, and there was much heat; there were shiverings, succeeded by fever and sickness.

On the following morning the head was giddy and painful, when raised from the pillow; there was much thirst; the pulse was 120. I applied the nitrate of silver over and beyond the inflamed surface, and directed the part to be kept exposed to the air. I prescribed an emetic and an active purgative.

In twenty-four hours the inflammation was found to be quite checked in its progress. Several of the inflamed parts had not been touched with the nitrate of silver; and I applied the salt on those places.

Large vesications had taken place over one part of the inflamed surface; the pulse was 80; the thirst, heat of skin, and headache had subsided. There was little smarting from the application, but my patient complained more of those places where the nitrate of silver had not been applied. The emetic and purgative operated well.

The next day my patient made no complaint; the pulse was natural; there was no fever or headache; the vesication was disappearing, and there was no increase or spreading of inflammation.

On Monday the inflammation and pain were gone, but there still remained some cedema of the foot.

In about a week from this time, from exposure to cold, from eating too much, or from not having rested, there was a return of the inflammation, which spread even more rapidly than at the first, with very great tension of the instep, so that I was much afraid of sloughing of the integuments; there were rigors; the pulse was exceedingly feeble and quick.

An emetic and purgative were prescribed, and the nitrate of silver was applied over the whole inflamed surface. I had the satisfaction to find that the same success followed this application, and all inflammation was subdued as before.

Some fluid, formed under the thick cuticle of the great toe, which caused irritation, required evacuating with the lancet.

I thought it necessary for my patient to rest in bed for a few days, to have a bandage, and to take purgative medicines, to prevent a recurrence of the affection. By these means she was preserved from any relapse.

CASE 20.—Mrs. Taylor, aged seventy-six, perceived a pain on the outside of the calf of the right leg on Saturday.

On the following morning this pain had increased; and on examining the leg, I found it much inflamed along the calf and towards the ankle. In the evening, when I saw her, she was labouring under a severe rigor; the pulse was 140, and the inflammation had spread all over the leg, except a little on the calf. I prescribed a bolus and purging draught, and applied the nitrate of silver over the whole of the inflamed surface.

On the following morning the pulse was under 100. The medicine had operated well, and there was no increase of inflammation.

The nitrate of silver was well applied. There were some vesications. My patient had passed a restless

night, and said she had suffered more pain than from an ordinary blister.

In the afternoon Mrs. Taylor had another violent shivering fit. I prescribed an emetic, which operated both on the stomach and bowels, and caused a free perspiration. I directed the saline effervescing medicine to be taken frequently.

On Tuesday morning the pulse was 80 ; the skin cool. There was no increase of inflammation ; the swelling was nearly gone. There were still more vesications from the application of the nitrate of silver.

On Wednesday morning the pulse was 80, the skin cool, and the vesications were disappearing. The inflammation was gone, and the patient might be considered convalescent.

On account of the cedematous swelling of the foot, she was enjoined to rest for several days.

She could not bear a bandage ; there was a little excoriation, to which I applied the neutral ointment.

CASE 21.—Monday, January 21st : Mrs. Saunders, aged fifty-seven, was seized with faintness, succeeded by a violent rigor, which continued a great part of the day. She took some brandy and water, and had a very bad night. The skin became very hot, with chilliness at times, and there was violent pain in the head and back.

On the following day it was found that the inside of the leg was inflamed, from the ankle up to the calf. On the evening of this day I saw her, and found the

whole of the inside of the leg affected with severe inflammation, having a dusky red hue, extending nearly round the limb, with several patches of inflammation on the thigh, and one on the groin. The absorbents were likewise inflamed. I prescribed an emetic, a dose of calomel, and a purgative medicine, and applied the nitrate of silver extensively over the whole inflamed surface.

On the 23rd I found that my patient had passed a painful night. The burning pain of the disease had ceased; but the smart of the nitrate of silver continued for some hours. The emetic had not acted, but the purgative had acted well. The inflammation was quite checked.

On the 24th there were vesications over the whole inflamed surface, but no inflammation. My patient had slight shivering during this day. She was directed to take a purgative.

On the 25th, the fourth day from the application of the nitrate of silver, the vesications are disappearing; there is no irritation, inflammation, or fever. My patient is, indeed, convalescent.

CASE 22.—A fine healthy boy, sixteen months old, had a feverish attack, attended with an erysipelatous inflammation on one hip and thigh, extending partially to the leg. The nitrate of silver was applied on the whole surface of the inflammation. The account of the child's mother was, that it cried very much for one hour after the application; then fell into a long and calm sleep, out of which it awoke

without fever, and calling out for food. In three days afterwards it was quite well, and the eschars were separating.

Phlegmonous Erysipelas.

An early application of the nitrate of silver in phlegmonous erysipelas is often sufficient to check and subdue the inflammation, and prevent the suppurative process.

I have found, when the case has been somewhat advanced, that a decided application of the concentrated solution has the extraordinary power, by subduing cuticular inflammation, of preventing the destruction of the cellular tissue underneath, and consequently preserving the integrity of the cutis vera.

Even in a patient where one limb has been as large again as the other, and which we could scarcely expect to be benefited, the application has so far modified the inflammation as to render it merely a case of simple phlegmonous abscess, which has been relieved by a free opening; and there has been no loss of cellular tissue, rendering the practice of making long incisions, heretofore adopted, quite unnecessary.

Should the system be affected, I have always adhered to the antiphlogistic plan, with success—*ipecacuanha* emetics, saline purgatives, quinine as a tonic, and light nutritious food.

CASE 23.—Mrs. B., aged sixty-eight, living in a low part of Nottingham (Narrow Marsh), had phleg-

monous erysipelas of the whole of the right leg, extending a little above the knee. The leg was as large again as the natural size, and was very tense and painful. There were some vesications on the fore part of the leg. The patient had been neglected, till the state of the limb alarmed her friends.

I directed an emetic, purgative, and a saline mixture; and applied the strong solution of the nitrate of silver very freely over the whole of the leg, and on and above the inflamed part of the thigh. The following days the nitrate of silver had the desired effect of allaying all irritation and inflammation, in which state it remained four days. On the second and third days a considerable degree of vesication had taken place, from the free application of the nitrate of silver. But I found the limb did not at all diminish in size. On that account I knew from former cases that suppuration had taken place. I made a free opening, about two inches in length, at the most depending part, about the middle of the limb. A large quantity of pus was evacuated, but there was not the least appearance of any sloughing of the cellular tissue. In a few days I made a small incision above the outer circle, from which some sero-purulent matter was discharged; and in a few days another incision, on the opposite side of the limb, from which issued only a little serous fluid—the limb quite recovered. No further application was required beyond the black lint and nitrate of silver to the sores, and a common linseed

poultice constantly applied and repeated every eight hours. I never knew a limb in the same state, under the common mode of treatment, to progress so favourably.

CASE 24.—Mrs. G., aged fifty, on the 30th of November had a smart attack of fever, attended with slight inflammation of the throat, which was treated with an ipecacuanha emetic, purgatives, and saline medicines. On the 4th of December the left side of her neck was attacked with phlegmonous erysipelas, which spread rapidly on the chest and arm, and was attended with considerable swelling of the parts. The concentrated solution of the nitrate of silver was well applied on the affected parts; but the inflammation being deep, and affecting the cellular tissue, it did not prevent the inflammation from spreading, although it subdued the inflammation on those parts where it was applied. The inflammation spread over the whole of the left arm, one half or rather more of the chest, abdomen, and the whole of the left leg. She had a succession of rigors, and fever attended each increase of the inflammation, but was directly relieved by a reapplication of the nitrate of silver. The strength of the patient was sustained by light nutritious food, a mixture with sulphate of quinine every three hours, and an occasional opiate.

The lower part of the body and the pudenda were much swollen, and there was retention of urine, requiring the use of the catheter for nine days. In this

case I have no doubt the deep cellular inflammation was subdued by a timely application of the nitrate of silver directly on the appearance of continued inflammation, and the suppurative process prevented. Only one abscess, which formed on the outer ankle of the leg, required opening as a phlegmonous abscess on the 4th of December, at which period the inflammation subsided.

I think in this case extensive suppuration and sloughing of the cellular tissue would have taken place, had it not been for the repeated and prompt application of the nitrate of silver.

Inflammation of the Absorbents.

Constitutional remedies are often required in inflammation of the absorbents—viz., emetics, purgatives, saline diaphoretic medicines, with an immediate attention to the origin of the disease. If this be a foreign substance, it should be removed; if an abscess, it must be freely opened; or if an irritable ulcer, the nitrate of silver should be applied to destroy the irritation.

The nitrate of silver should then be applied (either in substance or in the concentrated solution) freely over the whole of the inflamed and swollen surface, along the lines of the inflammation, and beyond them on the surrounding skin. The parts to be left uncovered.

By this means, in twenty-four hours the disease is most effectually arrested, and the numerous abscesses

often occasioned by this kind of inflammation prevented.

CASE 25.—Mrs. H——, aged thirty-four, had a swelling similar to a boil on the fore-arm near the wrist. The centre had a circular appearance, and on removal of the loose skin, presented an ulcerated surface, with highly inflamed and irregular edges. The absorbents were inflamed on the inside of the fore-arm, nearly to the axilla. Mrs. H——, could assign no cause for this affection, which had been coming on for four or five days. She complained of being indisposed and feverish.

The nitrate of silver was applied to the ulcer, particularly on the irregular edges, on the surrounding inflammation, along the course of the inflamed absorbents, and on the surrounding skin where there was any swelling. A blue pill and infusion of senna and salts were administered.

On the following day the inflammation was completely checked. The patient stated that in about half an hour after the application of the nitrate of silver she experienced sensible amendment, that the arm became much cooler and easier, and that it had remained so during the night.

On the second morning there was increased heat of the parts to which the nitrate of silver had been applied, as well as slight vesications on the parts which had been before most inflamed—viz., along the course of the absorbents, and around the ulcerated surface.

On the third day there was vesication nearly all

over the parts which were previously inflamed; but on the fourth day it had disappeared, and the cuticle was peeling off, leaving the parts free from inflammation. The eschar was adherent over the ulcer.

On the fifth day there was a slight discharge from underneath the eschar, and this continued for several days; after which the eschar remained perfectly adherent, and from this time no further attention was required.

CASE 26.—Ann Shipham, aged eleven years, fell upon the elbow about a fortnight ago, and removed the skin. This little wound was neglected, till it began to inflame, when her parents dressed it with some sticking-plaster, but the inflammation continued to increase. At the time this little girl was brought to me, the sore on the elbow was very much inflamed and very irritable; the surrounding skin was also inflamed to the extent of an inch and a half; the absorbents presented well-marked red lines up to the axilla, where there was an enlargement of the glands, attended with great tenderness. The patient complained of shivering; the tongue was furred, and there was headache and loss of appetite.

I wished to try the effect of the nitrate of silver, without using any other remedies whatever, so that I ordered her no medicine—a practice I would by no means recommend, as it is safer to use constitutional remedies from the beginning. I applied nitrate of silver along the inflamed absorbents, over the tumour in the axilla, and slightly on the wound and the sur-

rounding inflamed part. I then applied gold-beater's skin over the ulcer; the other parts were exposed to the air, and directed to be kept free from covering.

On the following morning I learnt from my patient that she had passed a restless night, and had experienced some smarting pain; her countenance, however, was improved, and, though her tongue still remained furred, she expressed herself as being much better, having now no headache. There was some vesication on the parts most inflamed, with slight tenderness, but no pain, that along the inflamed absorbents and in the axilla having entirely subsided.

On the second morning she made no complaint; her tongue was quite clean; there was no tenderness or pressure in the axilla, nor any fluid under the vesications, except a little on the most dependent part near the elbow. The cuticle above was becoming shrivelled; the eschar remained adherent on the wound from the first application.

On the third morning she appeared quite well. On the fourth morning the tongue had become white, I directed a little opening medicine. The arm remained perfectly well.

* CASE 27.—Mr. H——, aged sixty years, had laboured under symptoms of cold for several days, with uneasiness of the right leg. On the day on which I saw him he had rested, and taken nothing but gruel, as solid food had been rejected the day before. I saw him late in the evening, when he complained of chilliness, pain in the back, severe cough,

and considerable swelling and inflammation of the instep and small part of the leg, with inflammation of the absorbents all along the leg and thighs, and a broad inflamed patch, about the size of the ball of the hand, near the groin. There was a small ulcer on one side of the nail of the great toe, which probably was the source of irritation. I prescribed an emetic, a dose of calomel, and a purging draught. I removed a portion of the toe-nail which appeared to irritate the ulcer, and applied the nitrate of silver to the ulcer itself, on the inflamed instep and leg, and in the course of the absorbents. I then directed a cold poultice to be applied to the ulcer, and left the other parts to dry, protecting the leg by means of a fracture-cradle.

On the following morning I found that the nitrate of silver had not taken effect in some parts, owing to the oily state of the skin, the parts not having been previously washed with soap and water. But where it had been effectually applied, the inflammation was completely checked. I perceived some fresh lines of inflamed absorbents. I applied the nitrate of silver on every inflamed spot. The medicines had operated well; my patient had passed a tolerable night, having slept several hours together.

He made little or no complaint of the operation of the remedy, but said it was similar to a blister, but not so severe. He had a severe cough—I ordered him a mixture with ipecacuanha. In the evening vesication had come on, and I found the sole of the

foot and the side of the inner ankle was inflamed. I applied the nitrate of silver freely, and directed a pill with calomel, antimony, and opium to be taken at bedtime, and a purgative draught in the morning.

On the next day there was more vesication, but no increase of inflammation, and my patient made but little complaint; he had no fever from irritation, but the room had been too hot; the pulse was 100. He had an opiate draught at bedtime, and castor oil the following morning.

The following morning the vesication was subsiding, the inflammation was gone.

The castor oil had made him rather faint. The pulse was 80. He made no complaint.

From this period no further attention was required to the leg. The catarrhal affection continued troublesome for some days, for which the usual remedies were given. The patient was kept in bed during several days.

I have here to notice very particularly that, in the case of the nail growing into the side of the toe, where the absorbents are inflamed, I would never trust to forming an adherent eschar, but after removing the portions of the nail, I would apply the nitrate of silver to remove the irritation and pain, a little lint to separate the nail from the ulcerated part, and afterwards the cold poultice, kept *moist* with cold water.

By taking these precautions, every source of irritation is removed, and the nail is often preserved;

whereas the increased irritation of attempting to form an adherent eschar, and the confinement of the matter, would inevitably destroy the nail.

There is another practical fact I would mention in this place. A too free application of the nitrate of silver round the nail will separate it in the same way as a blister.

I cannot conclude this subject better than by inserting the following letter from my late brother-in-law, Dr. Marshall Hall:—

“MY DEAR BROTHER,

“I have had an interesting opportunity of watching the influence of the nitrate of silver in a case of inflammation of the absorbents, and I will briefly endeavour to state the obvious effects of the remedy. The case was that of a young lady, aged twelve years. It began by a chilblain upon the heel; inflammation of the absorbents up to the groin followed. Suppuration took place in twenty-four spots.

“The nitrate of silver was not applied during the first five weeks; this was very much regretted after its effects had been observed.

“The patient was seen by Mr. Lawrence and Mr. Wardrop, who both expressed themselves much interested in it.

“As the case would be long, I shall simply enumerate the effects of the application of the nitrate of silver in this case, as they presented themselves to my observation:—

“1. It prevented suppuration in many places where the redness and tenderness were recent, yet such before had inevitably led to the formation of pus.

“2. If suppuration had taken place, the tenderness was still promptly removed, and the pus being thick, white, and opaque, was first rendered thin and somewhat limpid, and perhaps streaked with blood, and then by degrees perfectly watery and limpid.

“3. When the pus approached the surface, a small opening formed by which it exuded, and it became unnecessary to use the lancet.

“4. The abscess was far more disposed to heal than any of those to which the nitrate of silver had not been applied.

“I may add that in several other cases I have seen the application of the nitrate of silver early, along the course of the inflamed absorbents, subdue the disease at once, rendering all other remedies totally unnecessary. I believe this would have been the case in the instance mentioned, had this remedy been applied very early.

“I am, my dear Brother,

“Yours very truly,

“MARSHALL HALL.”

Inflammation and Ulceration about the Nails.

In slight cases, the application of the nitrate of silver at an early period is sufficient to remove the inflammation. If it be caused by pressure of the side

of the nail, the edge of the nail must be removed before the nitrate of silver is applied. If there is an irritable fungous growth arising from ulceration, both it and the offending portion of the nail must be removed by sharp scissors, after which the nitrate of silver may be applied, and then a small fold of lint should be placed between the edge of the nail and wound, secured by a strip of neutral ointment on linen and adhesive plaster.

CASE 28.—I give particulars of my own treatment of myself, as illustrating the more severe class of cases. About a third part of the great-toe nail was separated underneath by ulceration attended with severe pain. I cut through the nail by means of nail forceps and sharp-pointed scissors, and tore the whole of that part of the nail away, exposing the ulcerated surface. I then well applied the solid stick of the nitrate of silver on the ulcer, and slightly around it, and defended the part with a little lint and strips of neutral ointment. The pain from the nitrate of silver was intense for some time; it then ceased altogether; an adherent eschar was formed, and the following day I was enabled to walk about as usual—no further application was required. The use of chloroform in such a case would be very valuable. I knew an old physician who lost his life from the effects of a small wound caused by cutting his great-toe nail. The above treatment would have prevented such a catastrophe.

Of Whitlow.

The nitrate of silver is very useful in the treatment of this painful affection. Patients seldom apply to the surgeon before suppuration has taken place.

It is then the best plan to open the abscess freely, to thoroughly apply the nitrate of silver *within* the cavity and the surrounding skin, and then to envelope the part in a cold poultice, using cold water to moisten it. In this manner the pain and irritation almost immediately cease when the smart of the nitrate of silver has subsided.

A second application is seldom necessary. In some cases, however, there is in a day or two an increase of inflammation, which requires the nitrate of silver to be again applied. When the inflammation has subsided, the loose cuticle may be removed, and the nitrate of silver must be applied to form an eschar. In slight cases, the nitrate of silver may be passed over the inflamed part; and in this manner suppuration and the continuance of inflammation are often prevented.

The following is copied from the *Lancet*, No. 196, Vol. XII.

CASE 29.—“ A girl, seventeen years of age, affected with paronychia of the middle finger, which was followed by inflammation of the soft parts, suppuration, and the formation of several sinuses extending along the second and third phalanges, accompanied with thickening and loss of motion in the joint. Under

these circumstances she presented herself at St. George's Hospital, and was informed that the only method of cure was the removal of the finger. Disliking much this proposal, she became a patient at Pantons-square. Mr. Wardrop immediately laid open the sinuses to their very bottom.

"Granulations of a healthy character made their appearance, and there was every prospect of a speedy recovery. A week subsequently to this, however, she was suddenly attacked with a most severe pain in the palmar part of the first phalanx, with slight redness and puffiness of the integument in its dorsal aspect, and general febrile derangement.

"Purulent matter soon formed; but the severity of the symptoms, notwithstanding the employment of general and local blood-letting, and the exhibition of large doses of opium, continued unabated, and she began to regret that she had not parted with her finger.

"In this distressing state, it was determined to try the plan of Mr. Higginbottom; and the nitrate of silver was applied, not only to the cavity which contained the matter, but also to the inflamed skin. The relief which this afforded was truly astonishing: after a few applications, the pain and swelling subsided, the small wound healed up, and a slight degree of stiffness in the joints only now remains."

Of Variola.

If the eruption be distinct, the solid stick of the

nitrate of silver should be applied on each pustule, and a little on the surrounding skin, previously moistened with a little pure water.

If confluent, the concentrated solution must be applied over the whole surface, as directed in erysipelas, and, if necessary, to the whole of the scalp (the hair being previously removed), and to the ears, the neck, or any other part where it may be thought necessary. I have used the application on various days, from the second to the fifth day of the eruption, but should prefer using it on the second or third day. If any part should be untouched, it must be applied to those parts on the next visit.

*Nitrate of Silver in preventing the pitting of Small
Pox, &c.*

Having observed, some years ago, that the nitrate of silver had been used on the Continent, by MM. Velpeau, Bretonneau, and Serres, for the purpose of preventing pits and scars consequent on small-pox, I was induced in one case to apply it as directed, by puncturing the centre of each vesicle with a needle, and then applying the solid stick of nitrate of silver. I found it effectual in preventing any further progress of the pox.

CASE 30.—The next patient on whom I used the nitrate of silver was a strong, healthy young man, about twenty years of age, with confluent small-pox.

I punctured a few of the vesicles on his face ; but,

being numerous, I satisfied myself with applying the *concentrated* solution over the whole surface of the face where they were most confluent, without making any punctures. The solution answered as well as where the punctures had been made, in arresting the progress of the eruption.

The next case of confluent small-pox was one where no punctures were made.

CASE 31.—Mr. P——, a young man, of nineteen years of age, and of a delicate constitution. From the confluent state of the pox, I should have expected deep pits and scars on his face. I applied the concentrated solution on the whole face, and the ears, in the same manner as recommended in erysipelas.

The progress of the vesicles was immediately arrested, and in four days they presented small hardened eschars, free from inflammation, whilst the pustules on the body were gradually proceeding to suppuration. In about nine days the eschar had come away from the face without leaving pits. In this case the nitrate of silver had not only prevented the pits, but the inflammation, irritation, and offensive suppuration, which are so distressing to the patient.

If thought necessary, the nitrate of silver might be applied all over the scalp, as in erysipelas, to prevent cerebral inflammation.

It might be applied on and within the cavity of the ear, to prevent otitis, and on the eyelids and conjunctiva to prevent ophthalmia.

I have used a solution of a scruple of the nitrate of

silver, in three ounces of distilled water, as a gargle to the throat, in small-pox cases, and with great benefit.

It appears from the *Lancet*, of January 28, 1843, that MM. Velpeau, Bretonneau, and Serres used the solution of the nitrate of silver over the whole surface of the small-pox; but it was found that, employed in this manner, the salt was utterly useless, that it masked the progress of the eruption from sight, without impeding its development.

The failure must have arisen from using *too weak a solution*. I never use any but a saturated solution, as an external application—*i.e.*, eight scruples of the nitrate of silver to one ounce of water, as directed.*

Of Gangræna Senilis.

An early application of the nitrate of silver is indispensable to afford a chance of checking the progress of this dreadful disease. It has been used with decided success when the toes have assumed a dark colour, and become a little swollen, with purple vesications on the lower and outward part of the leg. The solid nitrate of silver may be applied (the affected parts being previously moistened with water) freely on the affected toes, and lightly on the surrounding healthy skin, and also on the denuded skin, after the vesicles have been removed, so as to form an eschar. If successful, the eschar becomes adherent, the inflammation is subdued, and all evil prevented. The application

* *Vide formulæ on the last page.*

of the concentrated solution is equally successful. In due time the eschar will be thrown off, leaving the parts beneath it quite healed.

It will be desirable to give purgatives, and adhere to an antiphlogistic regimen.

CASE 32.—A retired tradesman, seventy-three years of age, of a full habit, was attacked with gangræna senilis.

Before my attention was directed to the disease, the third and fourth toes had assumed a dark colour, and became a little swollen; while two small purple vesications had appeared on the lower and outer part of the leg. The disease appeared to have existed for several days; and, from its progress, I feared the result would be unfavourable. I determined to try the effects of the nitrate of silver, and used it in the solid form, the parts being previously moistened with water.

I applied it freely on the affected toes, and over the surrounding healthy skin; and having removed the little vesications on the leg, touched the denuded surfaces, so as to form eschars.

The eschars became adherent, the inflammation was subdued, and all further mischief prevented. In due time the eschars were thrown off, leaving the parts underneath healthy.

The external application of the nitrate of silver to the surface of the skin appears to have a very extraordinary influence on the subjacent vessels, changing an unhealthy action into a healthy one.

What is very remarkable is, that after one decided application to the skin, its action is progressive, and is completed in four days. It was so in this case, as well as in all others.

From the success of the nitrate of silver in checking the progress of *gangræna senilis* in the above case, I am led to conclude that the disease is at its commencement confined to the capillaries.

The nitrate of silver would scarcely have such an effect, if it had a deeper seat. Ossification, or inflammation of the arteries may be the cause of *gangræna senilis* in certain cases, and in these the nitrate of silver will not, of course, be expected to effect a cure so readily.

The following case, recorded some years since in a communication from John Leigh, Esq., surgeon, of St. Ives, still further corroborates my views.

CASE 33.—A man of 79 years of age, with mortification of the little toe, whom I a year ago should have treated after the orthodox fashion, with opium for the excessive fits, bark, stimulating poultices, &c., and I firmly believe lost him, as a few months before I lost one.

With this man I commenced with the application of the nitrate of silver, and administered daily purgatives. The old man is now well. He did not take a grain of opium. I not only applied the nitrate of silver to the mortified parts, but on the surrounding skin, as you direct, and in a day or two all inflammation had left him.

I have lately received the following very satisfactory case from my friend, and formerly my pupil, Dr. Robert Beales, of Congleton, Cheshire.

CASE 34.—In April, 1863, I was called to see an old lady, aged seventy-five, who I was told had a bad foot. Upon examination I found she was suffering from gangræna senilis, which had been going on for more than a month. The little toe of the left foot was of a greenish black colour, and the odour evolved was putrescent. There was a distinct line of demarcation at the metacarpal joint. On the plantar surface of the great toe there was a patch about the size of a shilling, of a purple colour, and the second toe was of a dusky red colour. The temperature of the foot was low, and the pain considerable. .

I felt the case was serious, so I gave a guarded prognosis, but being well acquainted with Mr. Higginbottom's work on the nitrate of silver, and confident of the truthfulness of his observations, I determined boldly to try his plan. Commencing at the line of demarcation, and extending to, and a little over the healthy integument, I applied the concentrated solution of the nitrate of silver. The mortified part I enclosed in a linseed-meal poultice. The application of the nitrate of silver was applied on the fourth day. On the sixth day after the first dressing, the little toe came away at the metacarpal joint, and in ten more days the stump was healed, and looked as neat as it would have done after amputation with the knife. The first application of the solution arrested the disease in the other toes.

Two years afterwards my patient was found dead in bed. I examined the foot, and there was no trace of disease. This case indeed was perfectly satisfactory.

Destructive Inflammation of the Eye.

Between the years 1821 and 1825, I attended with my late brother-in-law, Dr. Marshall Hall, five cases of destructive inflammation of the eye, occurring during the puerperal state, all terminating fatally. They were published in the 13th volume of the "Medico-Chirurgical Transactions of 1827." Dr. Arnot noticed them in the 15th volume of the same Transactions, as arising from phlebitis. I had a similar case during the puerperal state, in the year 1832; the patient had a long illness, lost her eye, but quite recovered her health. I have no notes of the case, but I believe I depended on calomel as a remedy.

Should such another case occur in my practice, I would at a very early period apply the concentrated solution of the nitrate of silver freely on the conjunctiva, also upon the eyelids, and on the forehead and temple, around the eye for two or three inches, and of course attend to constitutional remedies.

I have from my own practice the most perfect confidence in the great power, and also as to the safety of the nitrate of silver application—whether of the stick or of the concentrated solution—in inflammation of the eye, and in severe cases of inflammation of the conjunctiva, purulent ophthalmia, &c.

CASE 35.—On November 28th, 1855, Mrs. G. was

attacked very suddenly with very severe inflammation of the conjunctiva of the left eye, with great chemosis. I feared a speedy destruction of the eye, and was aware that nothing short of very energetic treatment could avail in preventing the total destruction of the organ. I applied the concentrated solution very freely on the inflamed conjunctiva. This caused intense pain for a short time. It was gratifying to find that in four days the inflammation was as speedily arrested and removed as if the nitrate of silver had been applied on an external inflammation of the skin. The eye sustained not the least injury. The above case occurred to the same person as the one described, page 59, on Phlegmonous Inflammation. The inflammation of the eye commenced in twenty-eight days from the attack of erysipelas; fourteen days after the subsidence of the inflammation, at the period when my patient might be considered convalescent. There was no apparent cause for the attack previously, as there had been no erysipelas of the head or face.

CHAPTER IV.

OF PUNCTURED WOUNDS, BITES, AND STINGS.

IN recent punctured wounds the orifice must first be examined. If there be any extraneous body within, it must be removed by a pair of sharp-pointed scissors, or by a lancet or forceps. A drop of pure water should be put on the puncture, and the surrounding skin slightly moistened. The solid stick of nitrate of silver is to be applied within the former until a smart pain is experienced, and over the latter lightly, so as not to induce vesication. It should be applied to the skin for an inch round the puncture, and to a greater extent if the swelling exceed that space. The part is then to be exposed to the air. In this manner the usual terrible effects of a punctured wound are prevented.

In these cases the eschar is generally adherent from the first application of the nitrate of silver; but I have sometimes found the eschar, owing to its conical form, to separate from the wound before it is quite healed; it is then only necessary to repeat the slight application of the nitrate of silver to complete the healing process.

In punctured wounds of a later period, inflamma-

tion is usually present; the punctured orifice is nearly closed by the swelling, and a little fluid or pus has generally formed within. A slight pressure is to be applied to evacuate this fluid; a drop of pure water should be put on the orifice, and the nitrate of silver is then to be well applied within the puncture, and slightly upon and a little beyond the surrounding inflamed skin, and the parts are to be exposed to dry. In this manner an adherent eschar is usually formed, and the inflammation subsides. If there be any vesication, it may be simply left to nature; the fluid is soon absorbed or evaporated.

In cases of puncture, where the orifice is healed, and where an erysipelatous inflammation is spreading, attended with swelling, I have applied the nitrate of silver freely on and beyond the inflamed parts, and have had the satisfaction of finding that the inflammation has been arrested in its progress, and has shortly subsided.

I have several times applied the nitrate of silver on an inflamed surface, when I was not aware that supuration had taken place. Even in these instances an immediate check is given to the surrounding inflammation, and relief to the pain; but in three or four days there is an increase of swelling, attended by some pain, which is not usual, excepting when there is matter or some extraneous body underneath. In these cases a free incision must be made, and afterwards the nitrate of silver and cold poultice.

If there be reason to suppose that an abscess has

formed, it must be opened freely, and the nitrate of silver is then to be applied within the cavity, and on the surrounding inflamed or swollen skin. A poultice of bread and water, and cold water as a lotion, are then to be applied over the whole. The nitrate of silver may be applied every second or third day, if the swelling or inflammation require it, and the cold poultice may be renewed every eight hours.

In considerable punctures, where the adherent eschar cannot be formed, the nitrate of silver may be applied to the lips of the wound and on the surrounding skin for several inches, and the edges may be brought together by the interrupted suture or adhesive plaster, as in healing by the first intention. This mode of proceeding prevents the excess of inflammation and consequent suppuration, and the wounds have nearly healed as by the first intention.

The dreadful effects of puncture from needles, nails, hooks, bayonets, thorns, saws, &c., are totally prevented by these modes of treatment. I have now for nearly forty years adopted no other methods, and have the most perfect confidence in their success.

I. *Of Simple Punctured Wounds.*

CASE 36.—A young man received a punctured wound from a hook, of the size of a crow-quill, which pierced the flesh between the thumb and forefinger, on the outside of the hand. Scarcely a drop of blood followed, but there was immediate pain and tumefaction. The nitrate

of silver was applied without loss of time within the orifice and around the edge of the wound, and the eschar was left to dry. The smarting pain induced by this remedy was severe for a short time, but gradually subsided.

On the ensuing day the eschar was found adherent and there was little pain ; but there was more swelling than usual after the application of the nitrate of silver, owing probably to the mobility of the part.

On the third day the swelling remained as before, and there was little sense of heat.

On the fourth day, the swelling and heat had subsided, and the eschar remained adherent.

On the succeeding day the eschar had been removed by washing the hand, and the puncture was unhealed, but free from pain and irritation. The nitrate of silver was reapplied. From this time the eschar remained adherent, and at length gradually separated, leaving the parts perfectly healed. It is quite certain that, under any other mode of treatment, this severe puncture would have greatly inflamed, and have proved very painful and troublesome, while it is not improbable that suppuration and much suffering would have ensued. All this is effectually and almost certainly prevented if the nitrate of silver be applied promptly, as in the present case.

When time has been lost, the case is very different, as will appear hereafter ; but even in these cases the nitrate of silver proves an invaluable application.

CASE 37.—Mrs. Middleton, aged forty, wounded

her wrist on the ulnar side with the hook of a door-post; there was a considerable flow of blood at first, but this suddenly ceased, and the arm immediately became affected with great pain and swelling. The nitrate of silver was applied half an hour after the accident.

On the following day the eschar was observed to be adherent, and the patient reported that she had suffered scarcely any pain after the smarting of the application had ceased. There was a slight swelling round the puncture, but that of the arm had totally subsided. The nitrate of silver was applied over and beyond the swelling.

On the third day all tumefaction had subsided, and there was no complaint whatever.

I hoped that this case would have required no further attention or remedy; but my patient about a week after its formation accidentally rubbed off the eschar, and so exposed the subjacent wound unhealed. She, however, suffered no more pain or inconvenience from it, and it was again shielded by a fresh eschar, which remained adherent until removed by the healing process.

This puncture was so severe, that the arm was in a state of ecchymosis for the space of six or eight inches upwards, and I doubt not that without the nitrate of silver there would have been severe and long-continued suffering, and perhaps painful suppurations.

CASE 38.—Sarah Gin, aged twenty-four. Her general health had been in a bad state for two years, when she trod upon a nail in a piece of board lying

on the floor. It pierced the shoe and stocking, and entered the middle part of the ball of the great toe. On pulling the nail from the wound, several drops of blood followed. The foot was put into warm water; for two hours the pain became violent, and she passed a sleepless night.

On the following morning I saw her for the first time, and found the opposite part of the joint affected with inflammation and swelling, which extended to the instep. I applied the nitrate of silver over the inflamed and swollen surface and within the puncture, prescribed a dose of opening medicine, and, defending the part by a fracture cradle, exposed it to the air.

On the following morning my patient reported that she had passed a good night, and that the opening medicine had operated. There was no increase of swelling or inflammation; there was a little vesication from the nitrate of silver, and the cuticle was a little discoloured.

On the following day the eschar was adherent over every part, and continued so till it separated, leaving the puncture well.

I was much interested, indeed, with the progress of this case, for it was similar to Parr's hereafter mentioned, in which a different course became necessary, owing to the neglect of the early use of nitrate of silver.

II. *Of Punctured Wounds with Inflammation.*

CASE 39.—A servant-maid, aged twenty-four, ap-

plied to me with a swelling of the middle finger and of the back part and palm of the right hand, attended by such pain as to prevent her sleeping in the night. She thought this affection had arisen from a puncture by a pin or needle in washing. On examination, I perceived a small wound at the middle of the finger, at the first joint, and on removing the skin by the lancet, a little pus escaped, and left a very small cavity. I applied the nitrate of silver within this cavity, and over and beyond the inflamed parts of the finger and hand, previously moistened with water, and I left them exposed to dry. I prescribed an emetic and purgative medicine, and desired that the hand might be supported in a sling.

On the following day my patient stated that her hand was perfectly easy, and had been free from pain from the time the sense of heat occasioned by the application had subsided. She had passed a good night; the inflammation was completely checked in its progress; the swelling remained as before.

On the next day my patient made no complaint; the swelling had become soft and puffy to the touch. In a few days more the cuticle began to peel off, and in one point, where it was thick, there was a slight degree of tenderness. From this time there was no further trouble or complaint.

CASE 40.—Another servant, aged twenty, slightly wounded the fore part of the index finger at the first joint, by the bone of a hare which she was dressing. The wound healed in a day or two, and no notice was

taken of it. A few days afterwards the finger became swelled and painful, and affected with diffused inflammation of an erysipelatous character extending to the back part of the hand, and there it was bordered by a ring of a more vivid colour. I applied the nitrate of silver nearly all over the finger and upon the back of the hand, upon and beyond the inflamed border.

On the following day the swelling remained as before, and the patient complained of heat of the parts to which the application had been made, and a small part of the finger which had not been touched was very painful. I applied the nitrate of silver to this point.

On the succeeding day the swelling had become puffy, and the whole finger and hand were free from pain. A few days afterwards the hand was quite well; no medicine was given, nor was the patient prevented from pursuing her usual avocations.

This case was the more interesting because I had two similar ones a short time before, which had been occasioned by wounds received in cutting dogs' meat, and which, under the ordinary treatment, had been several weeks in getting well.

CASE 41.—A female servant punctured the end of the finger by a pin. There succeeded much pain and swelling, and it appeared that the nail would separate; the cuticle all round the finger was raised by the effusion of fluid. This fluid was evacuated, and a poultice applied.

On the third day the cuticle was removed, and the

exposed surface was found to be ulcerated in several spots. The nitrate of silver was passed slightly over the excoriated surface, which was then left exposed to dry.

On the succeeding day the eschar was adherent, and the pain had almost subsided. On the next day the eschar still remained adherent, and as there was neither pain nor soreness, the patient used her finger.

The eschar was at length removed by the healing process, and was separated together with the nail, and the case was unattended by any further inconvenience or trouble, either to the patient or myself.

It is scarcely necessary to contrast the advantage of this mode of treatment with that usually adopted. It is at once more speedy and secure, and less burdensome to such patients as are obliged to continue domestic avocations.

III. *Of Neglected Punctured Wounds.*

In many cases in which it is impossible to adopt either the mode of treatment proposed for the simple or inflamed wounds, it is of great utility to apply the nitrate of silver first, and then a cold poultice made without any oleaginous substance.* This plan is particularly useful in cases of neglected punctured wounds; in such as are attended by pain, swelling, and ulceration, and in cases of recently opened

* *Vide* formula on the last page.

abscesses. By these applications, the pain and swelling are much subdued, and a free issue is secured for the secreted fluid.

It is generally necessary to repeat the application of the nitrate of silver every second or third day, or occasionally, as the inflammation and swelling of the part may require; and the cold poultice may be renewed every eight hours, and may be kept moist with cold water.

CASE 42.—William Chantry, aged fifty, received a stab in the wrist with a hay-fork, and applied a poultice.

There were, on the next day, great pain and swelling; the wounded orifice was very small. I applied the nitrate of silver within the puncture, and on the surrounding swelling, and directed a cold poultice to be worn over it; the arm was kept in a sling.

On the succeeding day, the swelling and pain were diminished, and a little lymph flowed from the wound. I again applied the nitrate of silver, and continued the poultice.

Two days afterwards the swelling and pain were nearly gone. The poultice alone was continued, as from the entire subsidence of the swelling, the nitrate of silver was no longer requisite.

The patient came to me again in four days more, quite free from pain and swelling. The poultice was discontinued, and the nitrate of silver was then applied, in order to form an adherent eschar.

CASE 43.—Mr. Cocking's son, aged twelve, received a stab in the palm of the hand from a penknife, three days ago. The wound was followed by much swelling and pain, the punctured orifice being nearly closed. I applied the nitrate of silver within the puncture, and directed a cold poultice to be laid over the whole hand.

On the following day, I found that the poultice had not been applied; there were more pain and swelling, and inflammation. An eschar was formed over the puncture, which I removed, and thus gave issue to a considerable quantity of pus. I again enjoined the application of a cold poultice, kept constantly moist and cold with water.

On the succeeding day the inflammation had greatly subsided. I repeated the application of the nitrate of silver, and poultice. On the fourth day, the inflammation had nearly disappeared, and on the fifth entirely.

In such cases, the nitrate of silver unites the advantages of at once opening the puncture, and of subduing the inflammation, thus preventing the formation of deep-seated abscesses.

CASE 44.—A little boy, aged twelve, received a stab by a penknife on the fore part of the thigh. In a few days there was great pain and swelling; the orifice nearly closed, and he had fever, with headache. I applied the nitrate of silver deeply in the wound, and directed a poultice and a cold lotion to be kept upon the inflamed parts; and suspecting fascial

inflammation, I took away ten ounces of blood, and administered purging medicine.

On the next day the inflammation had greatly subsided. The poultice and lotion were continued.

On the third day there was some inflammation round the puncture, which appeared to be closing. I repeated the application of the nitrate of silver within the orifice of the wound.

On the fourth day, the swelling was subsiding, and there was no pain.

The poultice and lotion were continued from this time. There was no occasion for any further remedy; the little patient speedily recovered.

CASE 45.—Mr. Parr, aged thirty, of delicate habit, trod upon a needle, which pierced the ball of the great toe. A free crucial incision was made, but the needle could not be found. A poultice was applied to the wound, and over the poultice a cold lotion.

In the course of a week, part of the needle came away. Mr. Parr did not rest, as he was enjoined to do, and in consequence, severe inflammation came on; and in two days, a fluctuation was perceived over the joint opposite to the puncture. A free incision was made, and some pus was evacuated.

On the succeeding day the inflammation was somewhat abated. But on the next day it had again become exasperated, and the openings made for the evacuation of matter were somewhat closed by the swelling. I now introduced the nitrate of silver very freely into the opening, and reapplied a cold poultice and lotion.

On the following day, I found that my patient had slept well for the first time since the development of inflammation, and had suffered less, after the smarting pain from the application of the nitrate of silver had subsided, than before. The punctured orifices were open, and the skin, which was extremely tense the day before, was become soft and flexible.

From this time I found it merely necessary to repeat the application of the nitrate of silver about the third day, in order to subdue inflammation, and to keep the wounds open, which it always effected. The joint remained stiff, from which we may infer the violence of the inflammation; and the constitution of my patient was such that we cannot doubt that the remedy prevented many serious events usually consequent upon such punctures, under the ordinary treatment.

It is highly worthy of remark, too, that the good effects of the application of the nitrate of silver in this case were too immediate and distinct to be mistaken.

CASE 46.— — —, aged twenty-one, machine maker, whilst fighting in a state of intoxication, received a deep stab with a file on the inside of the wrist, in the direction of the transverse ligament. For two days the pain, inflammation, and swelling gradually increased. On examination I found the orifice nearly closed by the swelling, and there appeared much constitutional irritation. I passed the nitrate of silver deep within the orifice, and on the edges of the wound, and directed a number of leeches

to be applied to the surrounding swelling, and afterwards a warm white bread poultice, until the leeches should have done bleeding, and I prescribed an emetic and purgative.

In eight hours after the application of the leeches, I passed the nitrate of silver over the leech marks, and indeed, over the whole of the swelled and inflamed surface, and then directed a cold poultice to be put over the eschar.

The next day the parts were free from pain, and the swelling had much subsided.

The day after I applied the nitrate of silver within the orifice, and continued the cold poultice.

With three other applications of the nitrate of silver, made every second day, followed by the neutral ointment instead of poultice, this patient got quite well.

CASE 47.—This case illustrates the mode of treatment by the nitrate of silver of some of those terrible effects of punctured wounds, which have been neglected in the beginning.

B. Unwin, aged forty, washerwoman, applied to me on July 10, 1820, with severe inflammation and ulceration of the middle finger, arising from a puncture by a pin or needle some time before.

There was much painful tumefaction, and the integuments had burst along nearly half the length of the finger on the ulnar side, and over the middle joint on the radial side. The probe did not, however, pass to the bone, or into the joint. I applied the nitrate of

silver deeply in every part, and over the whole surface, and enveloped the finger in a cold poultice covered with cold water.

On the 11th she reported that she had slept well for the first time for a whole fortnight. There was scarcely any pain, but she complained of soreness; the swelling had greatly subsided. The nitrate of silver was again applied, and the poultice and lotion continued.

On the 12th there were still swelling and pain; there was considerable bleeding from the wound, so that I did not apply the nitrate of silver well.

On the 13th the swelling and pain were nearly gone. I repeated the application of the nitrate of silver, which induced bleeding from a fungous growth.

On the 14th the swelling had nearly subsided, and the cuticle was separated all over the finger. The nitrate of silver was applied extensively over the wounded and abraded parts. It induced little bleeding or pain.

On the 15th, the fungus was nearly removed; the wounds presented an appearance of slough over the surface. The nitrate of silver was applied to the fungus which still remained.

On the 17th the wound was much smaller, and the slough was separating. The nitrate of silver and cataplasm were applied as before. A similar report was made on the succeeding day.

On the 20th the slough was separating. The

nitrate of silver and cataplasm were applied. A similar report was made on the 22nd.

On the 24th, the slough having separated, the integuments over it were found to be flabby and loose. The nitrate of silver was applied to them.

By a continuation of this plan the wound gradually contracted, and at length, when there was no further use for the cataplasm, the eschar became adherent, and the ulcer healed underneath. It appeared highly probable to me, that, under any ordinary treatment, the finger in this case would have been lost.

IV. *Of Large Punctured Wounds.*

CASE 48.— — —, aged fifty, in returning home in the dark in a state of intoxication fell on one of the spikes of the iron palisades at his door. It pierces between the os hyoides and the chin to the depth of nearly an inch. The wound bled a little, and was very painful when I saw him some hours after the accident. The aperture was rather large and gaping, and as there was no possible chance of healing it by eschar, I applied the nitrate of silver on the surrounding skin to the extent of several inches, and to the edges of the wound. I then brought the edges of the orifice together by means of straps of adhesive plaster, and afterwards applied a compress and bandage. I prescribed a purgative.

In six days, during which interval there had succeeded no inflammation or swelling, and scarcely any

pain, I removed these dressings. The wound was much closed, and a serous discharge flowed from it. I applied the nitrate of silver again on the exposed surface of the wound, then a little lint, with the neutral ointment, then sticking-plaster, and lastly, a compress.

In three days more, the wound was nearly healed; there was rather more fulness round the puncture, but no inflammation. The nitrate of silver, lint, and cerate were again applied.

At the next visit of this patient, three days afterwards, the wound was well.

In this case the application of the nitrate of silver prevented the inflammation of the surrounding integuments, and the wound healed without the unpleasant effects frequently consequent upon large punctured wounds.

A great object is gained by the prevention of traumatic tetanus in punctures and lacerations, by the application of the nitrate of silver within the punctures and on the immediate edges of the lacerated parts, as it quite removes the irritation and inflammation consequent on such wounds.

It is worthy of remark, that I have never had a case of tetanus since I used the nitrate of silver.

V. *Wounds received on Dissection.*

It is not in my power to give any cases in illustration of the treatment of severe accidents resulting from

these wounds; for since I began the free use of the nitrate of silver, all the terrible effects of such wounds have been invariably prevented. I may here mention, that in the years 1813 and 1819, respectively, I was myself exposed to great dangers from punctures.

Since the latter period I have been repeatedly exposed to the effects of such inoculations, but in every instance the danger has been completely averted by the prompt and free application of the nitrate of silver.

I give the following case, in order to point out the mode of treatment I should now recommend.

CASE 49.—About eight o'clock in the morning I received a puncture in the examination of a puerperal case. I merely washed the part.

About four o'clock the same day, my attention was called to a sharp pain in the punctured part, on examining which there appeared a little elevation of the skin.

Three or four hours after, there was increased swelling round the puncture, and at this point was a small tumour, about half the size of a large shot-corn. I experienced a little headache, to which I was quite unaccustomed. I applied a spirituous embrocation, and went to bed. In the night I had an increase of pain, and became feverish and restless, with increase of headache; the thumb and hand were becoming more swollen, and the absorbents, up the arm, inflamed.

I took an emetic, and afterwards a dose of calomel, followed by a saline purgative, and an enema, and applied the embrocation constantly to the hand and arm.

Afterwards I began to take two grains of calomel, with two grains of James's powder every three or four hours.

About four o'clock the following day I experienced excessive pain in the punctured part. I therefore particularly requested that a free incision might be made into it, though I knew no suppuration could have taken place. This was done by a lancet. The incision gave considerable relief to the part, and for a short time the pain of the head was better; a large cataplasm was applied. In the course of the evening I experienced a slight chilliness, with violent fits of vomiting, which continued about half an hour; this was succeeded by great heat, and afterwards by profuse perspiration, at which time I became much easier, until it was followed, in the course of about another half hour, by another fit of chilliness, and vomiting, which was again succeeded by a hot fit and perspiration. The vomiting, hot fit, and perspiration were repeated at intervals for twelve hours, the second being attended with very violent knocking pain in the head. The hand was now become twice its natural size, and the arm was considerably swelled as high as the elbow, with some enlargement of the axillary glands. The tonsil on that side of the throat was also a little enlarged, and painful.

My medical attendant recommended the loss of blood; twenty ounces were therefore immediately abstracted, with decided relief of every symptom. The calomel had begun to affect the gums; the saline

purgative was continued. I had no return of the vomiting, but was in every respect better.

It is my opinion, from what I have since experienced, that this severe and painful illness would have been entirely prevented by the early application of the nitrate of silver, and that it would have been the only remedy necessary.

The treatment I would recommend is as follows:— Previous to a *post-mortem* examination, as a precautionary measure, any sores or scratches on the finger and hands should be treated by the nitrate of silver, applied to them so as to form an eschar as a protection.

After a *post-mortem* examination the hands should be well washed, then bathed with salt and water, or vinegar, so that any small wound or abrasion may be detected by the smarting pain occasioned; this precaution is especially necessary after a *post-mortem* examination of peritoneal inflammation and of puerperal patients.

Every suspicious spot should be then moistened with a little pure water, and the nitrate of silver should be freely applied on and within the affected parts, and lightly on the surrounding skin so as to form an eschar.

This plan is a most effectual preventive of the dire effects of dissection wounds.

If the puncture be deep, suction should be used to the part; then a drop of pure water should be put on the orifice of the puncture; the nitrate of silver should

then be well applied within the wound and lightly on the surrounding skin.

It is of the utmost importance in these cases that the nitrate of silver should penetrate to the bottom of the wound, so as to decompose the poison embedded in the wounded part—on this account it is most satisfactory when a smart pain follows the application of the nitrate of silver.

In the second stage, when the wound becomes painful or inflamed, and there is a tumour, or elevation of the skin, the tumour should be removed with a lancet, or, what is preferable, a crucial incision made through it, and the nitrate of silver should be applied to the wound, and on and beyond the inflamed swollen parts. If, on the following and subsequent days, the inflammation spreads, the application of the nitrate of silver should be repeated, an ipecacuanha emetic, followed by an active purgative, being given.

In the third stage of rapidly spreading inflammation, severe constitutional symptoms are present, and the violent throbbing pain in the head; the nitrate of silver should be applied freely over all the inflamed surface, and along the inflamed absorbents.

I would also, if required, recommend the same constitutional remedies which were successful in my own case.

VI. *Of the Bites and Stings of Animals.*

CASE 50.—James Jones, aged twelve, was bitten

by an ass on each side of the middle finger. The wounds were severe, and almost immediately followed by swelling and great pain. The nitrate of silver was well applied within half an hour of the accident.

On the succeeding day the eschar was found to be quite adherent, and the pain and swelling had subsided. The eschar separated in about twelve days, leaving the wounds healed.

CASE 51.—Mr. Worth's daughter, aged six, was thrown down by a dog, and bitten severely on the face and forehead, in three places. One of the wounds in the cheek was deep, and the parts were much bruised. The nitrate of silver was well applied in half an hour after the accident to each of the wounds, and the eschar was covered with gold-beater's skin.

On the next day the eschars were adherent. There was some swelling from the severity of the bruise, but the child made little complaint.

On the third day the swelling remained as before, but the eschar was adherent. On the fourth day the swelling had nearly disappeared.

The eschar separated in nine days from the infliction of the wound, leaving the parts healed and free from scar.

CASE 52.—Mrs. G—— was bitten by a little dog on the forefinger, about a fortnight before I saw her. There was then a very irritable, inflamed fungous sore. I removed the fungus by a pair of scissors, and applied the nitrate of silver to form an eschar.

On the succeeding day I found that the patient had

applied a little lint before the eschar was dry, which had prevented it from remaining adherent. I reapplied the nitrate of silver, and desired that the eschar might be exposed to dry.

The eschar remained adherent, the inflammation subsided, and the case gave no further trouble.

CASE 53.—A servant-maid was severely bitten by a dog in four places on the forearm, three days before I saw her. Adhesive plaster had been applied. There was a wound across the arm two inches in length, and three-fourths of an inch in breadth, attended by dull pain, and swelling of the arm. I applied the nitrate of silver to form an eschar, covering it with gold-beater's skin.

On the following day the eschar remained adherent round the edges, and had a puffy feel in the centre. I pierced it, and a little bloody fluid exuded. I touched the orifice thus made with the nitrate of silver. The swelling remained as before, with a degree of soreness.

On the next day the swelling had subsided. The eschar had the same character as before. A little fluid was again evacuated, and the nitrate of silver was reapplied to the orifice.

This mode of treatment was pursued for nine successive days, when the eschar remained adherent in every part.

The patient continued her usual avocation all along.

Under any other mode of treatment, I think it certain that she would have been compelled to rest

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for a number of days. Adherent eschars were formed on the other three bites, which were less severe from the first application.

Sting of a Hornet.

CASE 54.—The following case was given me by a military surgeon of the Lancers:—An officer applied to him with pain and swelling of his hand, from the sting of a hornet. He informed his surgeon that he purposed going to London the following day, but in consequence of the sting, he should be confined a fortnight, as had been the case previously by a similar accident. The nitrate of silver was applied; the pain almost instantly subsided, and the swelling the following morning. He went his journey.

I believe the nitrate of silver, if properly applied, will be found an efficient remedy in most cases of stings and bites from insects.

VII. *Hæmorrhage from Leech Bites.*

The point of a stick of the nitrate of silver should be firmly applied within the little orifice for a short time, and then a small piece of black lint should be firmly pressed on the part with the finger for two or three minutes.

In this manner the bleeding is effectually arrested. The black lint becomes firmly adherent; adhesive inflammation is produced, and the lint does not separate till the leech mark is healed.

VIII. *On Inflamed Leech Bites.*

It is worthy of observation, too, that the application of the nitrate of silver to leech bites, as soon as they have done bleeding, will cause an adherent eschar, and prevent that irritation and erythematous swelling, to which some patients are subject.

Where there is great inflammation several days after the application of leeches, it is quickly subdued by the external application of the nitrate of silver. Small irritable sores, from the effects of leeches, are readily healed by eschar.

CASE 55.—Mr. Beardsley had applied a leech on the calf of his leg. Several days afterwards the part inflamed, and was red, hard, and swelled to the extent of several inches in circumference, and down the leg. I applied the nitrate of silver slightly over the inflamed parts, previously moistened with water, and prescribed a purging pill and draught.

On the following day the inflammation was quite checked, and the pain and swelling gone. The eschar had a brown colour over its surface. On the succeeding day he was still better, and made no complaint. The eschar was black.

CASE 56.—Mr. B—— had an irritable small ulcer on the leg, surrounded by considerable inflammation, arising from a leech bite. I applied the nitrate of silver upon the ulcer, and lightly over and beyond the inflamed part. On the following day a little fluid had

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formed under the eschar, but the surrounding inflammation had subsided. On the succeeding day the eschar was adherent, and all inflammation and soreness were gone.

A very irritable ulcer sometimes forms after the application of leeches. I knew one lady who was confined during five weeks with several ulcers on her foot from such a cause. I have no doubt that the application of the nitrate of silver would have prevented all the inconvenience and suffering which she experienced; this observation is confirmed by the following case.

CASE 57.—An old man applied leeches to the instep for inflammation occasioned by a bruise. Several very irritable ulcers were produced, with some swelling.

I applied the nitrate of silver to form an eschar over each of them.

On the following day the eschars were adherent, the swelling had subsided, and he had slept well for the first time during several nights.

CHAPTER V.

OF THE TREATMENT OF BRUISED WOUNDS.

*
Wounds of the Shin.

THE nitrate of silver is an invaluable remedy in cases of bruised wounds of the shin.

In these, as in all other cases, the value of this remedy is greatly enhanced by an early application.

In shin bruises I have not had a single instance in which a cure was not effected by the adherent eschar, if the application of the nitrate of silver were made early, unless indeed the skin had been in an unhealthy and discoloured state from previous ulcerations, or in old persons, in whom the skin along the shin was tender from exposure to the fire, or in whom there was cedema. The difficulty of forming an adherent eschar is always increased by delay ; but in bruises along the shin, there is an additional reason for this increased difficulty, arising from their observed tendency to form a slough.

Here I must make an observation of particular interest, both in a pathological and curative point of view ; it is that the formation of this slough, in cases which have hitherto been under my care, has always

been prevented by an early application of the nitrate of silver. The fact may probably be explained thus:—the bruise destroys the organization of the part, and the subsequent inflammation completing what the injury had thus partially effected, a loss of vitality takes place, and the slough is formed. The early application of the nitrate of silver has already been shown to have the remarkable effect of preventing the inflammation consequent upon certain wounds, and in this manner, in the case under consideration, the part recovers from the injury done to its organization, and its vitality being preserved, one of the causes of sloughing is removed.

Whether this mode of explaining the fact be correct or not, the fact itself is extremely important; for the formation of a slough which the early application of the nitrate of silver can alone prevent, renders the formation of an adherent eschar more difficult, and doubles the time of effecting it. When the patient applies too late after the accident to prevent this formation of a slough, and the slough is superficial, I have removed it with a pair of dissecting forceps and scissors; and as the suppurative stage had not come on, the wounded surface has often nearly healed by the adherent eschar, it being only necessary to evacuate the fluid twice or thrice.

In recent bruised wounds of the shin, the nitrate of silver should be applied on the wound, taking care to leave no spot untouched, and upon the surrounding skin, to the breadth of one-third of an inch, *once*—that

is, *in such a manner as to induce an eschar without vesication*. Any moisture which may remain upon the wound is then to be removed by means of a little linen or lint, and the skin surrounding that on which the nitrate of silver was applied, is to be moistened and covered with gold-beater's skin, so that the whole may be protected from accident; the parts are then to be kept cool, free from covering, and freely exposed to the air.

This is usually all the treatment required in this kind of injury. It will be generally found that an adherent eschar is formed, and that no other application or attention is required.

If the eschar be removed by accident at any time, the application must be repeated as before. If due care be taken to avoid accident, it will be generally unnecessary to enjoin rest.

In the severer cases of bruise, attended by inflammation and swelling, in which the suppurative stage has not commenced, the nitrate of silver must be applied on the bruised, swelled, and inflamed parts, so as to induce an adherent eschar, and must be left to dry.

In those cases where a recent bruised wound is too considerable to heal by eschar, the nitrate of silver should first be applied on the surrounding skin for several inches, so as not to induce vesication, and over the wound which cannot be covered by the skin; the skin is then to be brought as nearly into apposition as may be, by means of adhesive plaster, without

any intervening dressing. The plaster will not irritate the skin or wound, for both are protected by the eschar. By this method the wound will often heal by the first intention.

Simple Bruised Wounds.

CASE 58.—The first case of bruise which I shall detail was not severe, but will serve to illustrate the mode of treatment by the adherent eschar.

Mr. Symons, aged sixty, slipped off a chair, and bruised the shin; the skin was removed to the extent of an inch in length in one part, and of an inch in length and breadth in another. He applied a common poultice. During the night he had much pain, and on the following morning there was severe inflammation round the wounds. I applied the nitrate of silver over both, and covered the eschars with gold-beater's skin, to prevent the contact of the stocking.

On the following day the eschars were found to be perfect; the pain had entirely ceased. There was a little vesication round one of the wounds. I simply evacuated the fluid of the vesication, and left the part exposed to dry.

On the third day there was no pain or inflammation, and the eschar remained adherent.

From this time no remedy was required. The eschar separated, leaving the surface healed in about a month from the occurrence of the accident.

The patient suffered no inconvenience, nor was he confined from his labours a single day.

CASE 59.—The following case was far more severe, but the mode of treatment was no less efficacious.

Mr. Granger, aged thirty-six, received a severe bruise, by a quantity of stones which had been piled up, falling against the outer side of the leg. He was extricated from this situation with much difficulty. Besides the bruise, the skin was removed to the extent of ten or twelve inches in length, and in some parts to that of an inch and a-half in breadth; and in the fore part of the ankle a deep furrow was made by the rough edge of one of the stones. I applied the nitrate of silver, about half an hour after the accident, over the whole surface of the wounds, and protected the eschar by the gold-beater's skin. The patient was directed to keep the leg cool and exposed to the air; he took no medicine.

On the succeeding day the leg was a little swelled, but the patient did not complain of any acute pain, but only a sense of stiffness. An adherent and perfect eschar was found to be formed over the whole extent of the wound. There was no fever.

On the third day the swelling had abated. No further remedy was applied. Rest was still enjoined.

On the fourth day the swelling was nearly gone. The eschar remained adherent. The patient walked about.

From this time the patient pursued his avocation of a stonemason. No further remedy was required;

no inconvenience experienced, and the eschar separated in about a month.

I think it would have been quite impossible to heal this wound by any other remedy in less than a month, during which period the patient must have suffered much from pain and fever, and have been confined to the bed or sofa.

It is also quite certain, I think, that there would have been an extensive slough from the severity of the bruise. This was doubtless prevented by the application of the nitrate of silver.

CASE 60.—J. Jennings, bricklayer, aged twenty-six, fell through the roof of a house, and bruised and lacerated his shin rather severely, to the extent of an inch and a half in one part, and in a less degree in several others. I applied the nitrate of silver to the wound immediately. On the following day the eschar was found to be adherent, and there was neither pain nor swelling.

The eschar separated in nine days, leaving the wound healed.

It is remarkable that the eschar remains a greater or less time over the wound, according to the severity and exigency of the case. This case being less severe than the former, one of the eschars remained upon the wound during a much shorter period of time.

CASE 61.—An old man, aged sixty, received a bruise upon the occiput, from a fall; the skin was lacerated and removed to the extent of half-a-crown. I applied the nitrate of silver soon after the accident. On the next day an adherent eschar was formed.

There was neither pain nor swelling. The eschar remained adherent, and separated in about a fortnight, leaving the wound healed.

CASE 62.—Mrs. C——, aged forty, was detained on a journey by a bruised wound on the knee, received a fortnight before, which was healing very slowly under the usual mode of treatment. The inflammation was subsiding, but the sore was extremely irritable and painful, and she was prevented from moving by the degree of inflammation still present. I applied the nitrate of silver very slightly over the sore. I left the eschar to dry, but was doubtful whether it would be adherent or not.

On the succeeding day, I found the eschar did remain adherent, that the inflammation was diminished, and that the pain had entirely subsided after that induced by the nitrate of silver had ceased.

On the next day the lameness was gone, and there was no sort of inconvenience from the wound. My patient continued her journey on the following day, so that I do not know when the eschar separated.

CASE 63.—Robert Hill, aged sixteen, received a blow from a bone which was thrown at him and struck the outer condyle of the humerus. He complained of extreme pain, and there were much redness and swelling. I applied the nitrate of silver over the part, and directed it to be exposed to the air.

On the succeeding day I found that the eschar was quite adherent, and that the pain, redness, and swelling had much subsided, although there was some stiffness of the elbow.

On the third day there was still further amendment. From this time no remedy or attention was required.

CASE 64.—Mr. H—— fell with great violence against the sharp edge of an oak table, which caused a severe bruised wound an inch in length across the middle of the nose. The wound bled most profusely for some time. The part was bathed with cold water about two hours; and it being bedtime, a small fold of linen, moistened with cold water, was placed on the wound. On removing the linen in the morning, the wound bled a little, but the pain and irritation were nearly gone.

The stick of the nitrate of silver was applied on the wound. An eschar was formed, which remained on for about ten days, when it dropped off, leaving the wound healed.

In three months the cicatrix was scarcely discernible, and there was not the least loss of substance.

Inflamed Bruised Wounds.

CASE 65.—Mr. W. Lee, aged forty, had his hand crushed between a wall and a waggon-wheel. He applied a poultice. In a few hours the back of the hand swelled very much, and he passed the night without sleep. On the next day I saw him; the back of the hand was much swollen, and very tense; there were two wounds, each the size of a sixpence. I applied the nitrate of silver all over the bruised and inflamed

surfaces, and directed them to be exposed to the air. He took a dose of calomel that night, and a purging draught on the following morning.

On the following day I learnt that Mr. Lee had passed a better night; the eschar was adherent throughout; there was no vesication; the swelling remained much the same.

On the fourth day from the application of the nitrate of silver, the swelling was gone, and there was scarcely any pain.

From this time no further attention was required; but I cautioned him not to use his hand too soon.

CASE 66.—Mrs. Willoughby, aged fifty-one, received a blow on the arm which caused a wound and broke the radius; the wound did not, however, communicate with the broken bone. The part was inflamed, but the arm itself was not swollen. I saw her immediately after the accident, and applied the nitrate of silver on the whole of the forearm and over the wound; I put the arm upon a splint and sling, and prescribed a dose of calomel and a dose of purgative medicine.

On the following day she complained of little or no pain, and had very little smarting from the application of the nitrate of silver; and there was less swelling than is usual in such cases. The eschar was adherent over the wound; there was slight vesication on the arm. The next day she expressed herself as surprised that she had had so little heat or pain.

Two or three days afterwards the eschar was ad-

herent all over the arm, and nothing was necessary but to keep it in the splint till the bone should be united.

I have no doubt that a similar treatment may be adopted with advantage in compound fractures. An adherent eschar was formed upon the wound, and by applying the nitrate of silver on the skin of the lacerated wound and on the surrounding skin—which may be done with safety to any extent—the inflammation will be materially lessened. No evaporating lotion, or other means which I have ever yet seen employed, has the same power of preventing and subduing external inflammation in such cases as the nitrate of silver.

CASE 67.—Mr. C—— fell upon his elbow and caused a slight bruised wound, to which he applied tar and spirits of wine. In three days severe inflammation took place, and spread rapidly over the whole of the arm from the hand to the axilla. The arm became hot and hard, and swollen to one-third more than its natural size—the affection had evidently the character of phlegmonous inflammation. He had used a fomentation for some hours. His general health had not suffered.

I applied the nitrate of silver once over the whole inflamed surface and upon the wound, the parts being previously moistened. I directed the eschar to be exposed to the air.

Twenty-four hours afterwards the inflammation was checked; the swelling indeed remained much the same, but the pain and the heat were gone.

On the next day the arm had the puffy feel before described, and there were a few vesications.

In two days more the swelling had spread on the hand, where the nitrate of silver had not been applied; although there was now but little swelling on the arm, it was not, however, necessary to apply the nitrate of silver, as there was no redness.

Two days afterwards the swelling was gone and the eschar was peeling off; the wound at the elbow was well and required no further attention.

Bruised Wounds with Slough.

CASE 68.—Mr. E—— applied to me with a bruise on his shin, about an inch in length and half an inch in breadth, with a slough occupying a great part of it. As there was but little inflammation, and the suppurative process had scarcely commenced, I wished to heal it by eschar; but knowing that it would at least require a fortnight for nature to throw off the slough—and the patient being obliged to go to a distance in a few days—I was led to the expedient of carefully removing the slough with dissecting forceps and scissors. This was readily accomplished, as the slough was not deep. I afterwards applied the nitrate of silver to form an eschar, and defended it with gold-beater's skin.

On the following day my patient went a journey of seventy miles, and I did not see him until the evening of the subsequent day, when I evacuated a

very little fluid from underneath the eschar. This I had to repeat twice more, when the eschar proved adherent.

Mr. E—— went his journey, and I did not see him again for several weeks; the eschar was then still adherent, but as it was loose I removed it; the surface was healed underneath.

Severe Bruised Wounds.

CASE 69.—A servant-man had the index finger crushed by a heavy box falling upon it, so that the integuments were laid open to the bone to a considerable extent. He applied a poultice.

The next day I washed the finger, and applied the nitrate of silver lightly over the surface of the wound, but not deeply within the wound, and all over the skin of the first and second joint; I then applied a common adhesive plaster.

I saw him several times during the space of a week, and during that time he complained of very little pain; and there was no swelling or heat. On removing the adhesive plaster there was no matter, and only a slight discharge of lymph from the wound. I again applied the nitrate of silver, and over it the adhesive plaster, repeating the application every third day. By such treatment, this formidable bruise got quite well, without any suppuration or inflammation, and the man used his hand in about ten days from the first application.

CASE 70.—As two men were carrying a heavy bundle of iron rods, it slipped from the hands of one and fell on the toe of the other. The blow was so severe as to cut through a strong shoe, and even to shatter the nail of the great toe and drive it into the surrounding integuments, causing also a slight fracture of the bone of the first phalanx of the great toe, which was exposed.

The case was so severe that I almost resolved to remove the toe; but finding the integuments underneath in so bruised a state that I could not depend upon them as a covering, I wished to try the nitrate of silver. After removing the portions of loose nail, I applied this remedy over the whole skin of the toe, and on as much of the wound as was exposed after the parts were closed by the hand of an assistant. I then applied the adhesive plaster, so as to keep the parts together; and over it two or three folds of linen moistened with cold water.

The patient complained of some pain for three days, and then became easy. I did not examine the wound for nine days. I then found it in a quiet state and free from inflammation; the surface of the sore appeared to be covered with a layer of coagulated lymph. I again applied the nitrate of silver, and over the eschar first lint, then a plaster of the neutral ointment, and then adhesive plaster.

In another three days the sores were nearly healed, except the part occupied by the nail which had been removed at my first visit.

I applied the nitrate of silver every third or fourth day, for four times, when the wound was quite well. A new nail was making its appearance about the end of three weeks *after* the accident.

CASE 71.—As a warehouseman was standing upon a floor three yards from the ground, a pile of cheeses fell upon him and forced him through the doorway into a yard: his leg came in contact with the edge of a large weight, which inflicted a wound three inches in length across the knee, under the patella; he also received a severe shock from the fall, which made him feel much indisposed, and he went to bed. When I saw him, the wound was large and gaping: I removed several loose portions of cellular substance, which would have prevented it from healing by first intention, and I applied a suture in the middle of the wound to bring the edges together. I then applied the nitrate of silver once over the whole of the knee, on the irregular edges of the wound, and on the exposed surface of the wound where the edges of the skin did not meet; and then applied the adhesive plaster, and kept the part exposed.

On the next day I found that the knee was a little more swollen, which I thought arose from the severity of the bruise. I removed the ligature, applied the nitrate of silver to the ligature marks, and then the adhesive plaster, and lastly, the lotion of cold water extensively over the whole knee. I took ten ounces of blood from the arm, and prescribed a saline purgative.

At my next visit the man made no complaint. I

removed the plaster in a week ; the surface of the sore had the same appearance as in the former case ; there was a layer of coagulable lymph on its surface ; there was no inflammation or pain.

I applied the nitrate of silver every third, or fourth, or fifth day.

From the first there was no suppurating surface.

The case was well in a little more than three weeks.

Lacerated Wounds.

CASE 72.—*Lacerated Wounds of the Face.*—Miss R——, aged twenty. On a very windy day, a piece of slate was blown from the roof of a house, which fell upon her forehead, and inflicted a wound of five inches in length, commencing on the forehead, above the right eye, passing obliquely across the nose, and terminating on the left cheek, leaving a large open wound, quite disfiguring the face. The wounded parts, after being well cleansed from extraneous matter, were neatly closed by the interrupted suture ; the nitrate of silver was then applied along the edges of the wound, on the line of the wound, and also on the surrounding skin ; afterwards strips of adhesive plaster were applied without any other covering.

The wound healed by the first intention, and required no further application. It is now many years since the accident. A common observer, standing at a short distance, cannot see the mark of the union, for no disagreeable mark or cicatrix remains.

CASE 73.—A boy was standing on a wall, supporting himself against some iron palisades fixed on the wall; not having a firm footing, his feet slipped; he threw his head forward, and his cheek came in contact with a sharp iron spike at the top of one of the palisades; it pierced through the lower part of the cheek, fractured the malar bone, and perforated the upper part of the cheek, so as to cause two lacerated wounds, two inches in length, one above the fractured bone and the other below.

After the parts had been washed, the wound was closed by two interrupted sutures; the nitrate of silver was applied to the edges of the wound to destroy their irritability, and an inch upon the surrounding skin; also over the surface of the small line of wound that was left exposed; but not within the wound. Adhesive strips were supplied to support the part; no bandage was put over it.

In four days the wound had healed by the first intention—except a small opening in the lower wound. The ligatures were removed on the third day, and the slight orifice made by the removal of the ligatures was touched with the nitrate of silver, to prevent inflammation or ulceration. It was observed that a clear fluid flowed from the small opening that remained in the lower wound. This was found to arise from a wound in the salivary duct.

After three applications of the nitrate of silver, to form an adherent eschar, this small opening was closed; and in three weeks there was no further discharge of saliva, the wound being healed.

The use of the nitrate of silver in parotid fistula, I had previously practised, in a case of seventeen years' duration, published in the *London Physical Journal* for January, 1830. In this case there were two orifices—one was healed by the nitrate of silver, the other with the concentrated sulphuric acid.

Lacerated Perinæum.

CASE 74.—Mrs. H——, in her first labour, drew herself suddenly away from any assistance, at the moment of the expulsion of the head of the child, and, in consequence, the perinæum was lacerated just above the right side of the median line, entirely through the sphincter ani.

The parts were directly united, by the interrupted suture, in two places, and the nitrate of silver applied along the skin on each side, close to the line of the wound, and on the line of the wound, and left without any other dressing.

No swelling or inflammation followed to require any other treatment.

On the expiration of the second day, a dose of castor-oil was given, which had the desired effect of opening the bowels without disturbing the parts.

On the third day the sutures were removed, and the ligature marks touched with the nitrate of silver to prevent ulceration. The wound united by the first intention; there was no swelling, and it is worthy of observation that the eschar surrounding the laceration made by the nitrate of silver, had the power of fixing the parts as if adhesive plaster had been applied.

No further treatment was required, and the patient experienced no further inconvenience.

It is now thirteen years since this case occurred, and the patient has borne nine children, but there has been no other laceration.

On examining the part lately, the mark of the wound is scarcely perceptible, except that one point is a little raised at the anterior edge of the perinæum.

If another case should occur, I should use the catheter to draw off the urine for the first three or four days, although in this case no injury was sustained by omitting to do this.

Of Incised Wounds.

In small incised wounds the nitrate of silver is to be applied slightly over the skin, close to the wound, *but not within the wound*, and the edges of wound brought together by adhesive plaster. In larger incised wounds, as in amputations, &c., where the interrupted suture is used, I would first close the wound by the sutures, and then apply the nitrate of silver on the surrounding skin, and over the line of the wound along its union, so as to insure as much as possible the healing of the wound by the first intention. The part being exposed, having no other covering but the eschar, favours much the healing of the wound. If strips of adhesive plaster be required to support the parts, no irritation will be produced on the skin where the nitrate of silver has been applied.

In incised wounds of the face, as in hare-lip, &c., the method of treatment by the nitrate of silver is very valuable, as inflammation and swelling are prevented, and adhesive inflammation is speedily produced. When the sutures are removed, the small orifices remaining should be touched with the nitrate of silver, to prevent ulceration.

The following case of compound fracture was given me by A. Colclough, Esq., surgeon to the Lancers, whilst residing in Nottingham barracks :—

Compound Fracture.

CASE 75.—James Biddlecombe, aged thirty-two. November 6th: At field exercise this morning, at the race-ground, this man received a kick on the left leg from a front file, which produced a compound fracture of the tibia at the upper part of the lower third. The man was conveyed in a cart to the hospital. The boot and stocking were cut off, both being soaked in blood, when a wound of the integuments was perceived rather more than half an inch in length, with the upper portion of the fractured end of the bone protruding a little. There was considerable extravasation of blood at the outer side and along the skin upwards, and which flowed gently from the wound.

Treatment.—Very gentle extension only was necessary to replace the bone; and the man not being very muscular, its coaptation was easily perfected. The ecchymosis at the outer side made the part look irregular. A stick of the nitrate of silver was applied

along the edges of the wound. A little dry lint on the part, and a tail bandage applied, the leg being extended and secured by splints. An evaporating lotion in small quantity used on the injured parts. At night a pill of ext. opii, gr. ij.; ext. colocynth. c., gr. xij.

7th.—The limb feels particularly easy; no starting or shooting pains. He had good sleep; pulse 70. Bowels not freed since admission. There is an oozing of blood, which has discoloured the linen. I had intended looking at the wound, and placing the leg on the side, bending the knee; but from the comfortable feeling of the man, and the present position not being irksome, I have not done so, merely securing the leg better by junks, and putting a fracture cradle over the limb.

Treatment.—

R. Ol. ricini, ℥ss.

Tinct. sennæ, ℥ss. Misce.

Fiat haust. stat. sumend.

8th.—He had but little sleep, though perfectly free from pain; leg particularly comfortable. Two motions from the oil, the first very costive and difficult to pass. Pulse 78. Skin and tongue natural. The limb lies well, is quite free from starting or restlessness of any kind. An evaporating lotion is applied, but not in great abundance.

Treatment.—I cautiously untied the tapes, passed the splints aside, and cut in front, so as to bring the wound in view. There was a small black eschar, with an oozing of sanies from the centre. No sur-

rounding redness, and general tumefaction not great. The inequality from the extravasation of blood not apparent, and all looking as well as can be. I placed clean cloth, and again secured the leg.

Treatment.—

R. Tinct. opii, gr. xxxv.

Liq. ant. tart. ʒiss.

Aquæ, lbss. Misce.

Fiat mist. cap. coch. ij, 4 tis horis.

9th.—He appears to be going on well. Pulse regular. Bowels open freely at nine o'clock last evening. I imagined he would have a bad night, so I allowed him an anodyne draught. The leg lies well and is free from pain. I have not opened the bandages this evening.

Treatment.—Lotion; low diet.

10th.—Wound inspected this morning, and looked extremely well. An eschar occupied the whole of it. No surrounding inflammation. The centre of the eschar was not so dry as the edges. There was no discharge. I again applied the nitrate of silver slightly to the centre. I applied dry cloths, compresses, and replaced the splints.

Mr. Colclough continues a similar treatment, discontinuing the opiate at bedtime, an occasional dose of castor-oil with tincture of senna, and several times re-applying the nitrate of silver as required, owing to a separation of the eschar, &c. On the 1st of December sore nearly healed, bowels regular, and general good health.

6th.—Wound scarcely cicatrized as yet, though the extent is not more than a quarter of an inch. Bowels regular. He feels confidence and strength in the limb.

The last report has no date, but appears to be a few days later.

The sore has quite cicatrized with an even surface to-day. I have taken the splints off, merely leaving the junks for a little longer. His bowels are regular, functions natural, and in all respects doing well.

CASE 76.—The following case of compound fracture I received with other cases treated with the nitrate of silver, from Mr. Winter, surgeon, of Brighton. Not having taken daily notes of the cases, he has given some details and the results:—

A poor woman fell from a cart, in which she was riding, whilst going down a steep hill. The wheel passed over one of her hands, tearing the integuments on the back of the hand considerably, and exposing the fractured portions of two of the metacarpal bones. Having cleansed the wound thoroughly, I gently passed a stick of the nitrate of silver over the whole of the denuded surface and fractured bones, and also a full inch round the wound on the sound skin. It was too much bruised to be sensitive to much pain. I strapped up the wound lightly, and bandaged the hand, with a ball in the palm of the hand to support the bones. The wound healed rapidly, and the bones united as quickly as if it had been a simple fracture.

CHAPTER VI.

OF THE TREATMENT OF ULCERS.

FROM the preceding observations it would naturally be concluded that the nitrate of silver would afford a remedy for the treatment of ordinary ulcers. This conclusion is perfectly just: yet the attention, discrimination, and experience required on the part of the surgeon, and the necessary care on that of the patient, render the mode of healing by *eschar* rather difficult.

I have therefore abandoned this mode of practice, except in those cases where the ulcers are small and free from inflammation, where there is but little discharge, and where the parts are not exposed to much motion or friction.

The plan of treatment which I have more recently adopted in large ulcers, attended with inflammation, is far more successful, and requires very little care or attention on the part either of the surgeon or patient.

If there be swelling or œdema, I direct the patient to take a dose of opening medicine, to apply a common poultice of bread and water over the ulcer, and to keep in bed for four-and-twenty hours. The inflamed parts

must be washed with soap and water, and wiped dry. They are then to be moistened with water, and a long stick of the nitrate of silver or the concentrated solution must be passed all over the inflamed and ulcerated surfaces twice, and rather more freely on the ulcer itself and on the surrounding skin. Lint must then be put on the ulcer, and the whole of the inflamed and ulcerated parts must be covered with the neutral ointment spread on linen; a compress of five or six folds of fine linen is then to be applied over the ulcer, and a common roller, not too tight, to keep on the whole.

The leg is to be examined on the fourth day, when it will be found that the inflammation is nearly if not entirely gone, and the ulcer is in a healing state.

The nitrate of silver must then be applied on the whole of the ulcer, and once lightly over the skin immediately surrounding it, one or two inches in breadth; the lint and ointment are to be applied as before, and the bandage rather tighter. The case must be treated in this manner every third or fourth day until the ulcer be healed. I would recommend wearing a calico roller, or a lace stocking, for some time afterwards, till the leg has recovered its usual strength. The patient may walk about after the first or second application of the nitrate of silver.

Of Small Irritable Ulcers with Varicose Veins.

Small ulcers attendant on varicose veins on the legs, are usually very indolent, irritable, and painful.

In these cases I have found the nitrate of silver an excellent remedy. If the ulcer is rather deep, it may be lightly filled with the scraping of black lint, or if superficial, with a little black lint covered with a plaster of neutral ointment, a compress of several folds of linen, and secured with a bandage or lace stocking.

It often happens that an adherent eschar is formed after the first application, the lint is adherent and must not be removed; but if it is unadherent, the remedy must be repeated every third or fourth day, or as required. A bandage or a lace stocking should be continued.

Sometimes from neglect a natural scab is allowed to remain on the ulcer, over the varicose vein, and this being accidentally removed, a profuse hæmorrhage has followed. The above treatment will prevent the evil, and if the hæmorrhage should take place, the application of a fold or two of black lint, secured by strips of adhesive plaster, a plaster of the neutral ointment, and a compress of several folds of linen and a calico roller, will be sufficient; the patient should remain in the horizontal position for several days.

On Healing Small Ulcers by the Unadherent Eschar.

CASE 77.—The following case occurred in the person of a lady affected with varicose veins, and far advanced in pregnancy. Its speedy cure by the nitrate of silver was therefore the more remarkable, and saved her much trouble and suffering.

Mrs. C——, aged forty, had two small irritable and inflamed ulcers, under the inner ankle. I applied the nitrate of silver to form eschars.

It was requisite to evacuate a little fluid from under the eschars for three successive days. They then remained adherent.

About the usual time the eschar separated, leaving a small point of the size of a pin's head unhealed; this point I touched with the nitrate of silver. The case required no further attention.

The narration of this case leads me to advise my readers always to examine the parts carefully after the separation of eschars; and if there be the slightest ulcer remaining, to reapply the nitrate of silver.

CASE 78.—Mr. S—— had been confined to the bed or sofa five weeks under surgical care, in consequence of a broken shin. The wound was in a healing state when I saw it, but would evidently require several weeks for its cure if treated according to the common method. There was but little surrounding inflammation; and in every respect the case was a proper one to be treated by eschar. I applied the nitrate of silver to the sore, and once very lightly over the surrounding skin; I then covered it with goldbeater's skin and directed it to be exposed to the air.

On the following day, after making an incision with a lancet in the centre of the eschar, a little fluid was evacuated on pressure. I touched the orifice with the nitrate of silver and reapplied the goldbeater's skin as before.

On the two next days there was rather more fluid evacuated ; but on each succeeding day to the seventh there was less ; the eschar then became adherent.

The eschar separated in about a month, and the sore was well.

CASE 79.—The following case went on more favourably than some which I have since witnessed ; and I should not now recommend the same treatment on account of the inflammation.

An old gentleman came to me with an ulcer on the shin about an inch in length, which was very painful and inflamed. I applied the nitrate of silver to form an eschar, and requested him to call the following morning. He did not come, however ; but on seeing him on the subsequent day, it was requisite to evacuate a little fluid from beneath the eschar ; this was repeated on the third day, after which period the eschar remained adherent and the part totally free from pain.

The eschar separated in about three weeks, leaving the ulcer healed.

CASE 80.—The peculiarity of the present case arose from neglect in evacuating the fluid effused under the eschar the day succeeding its formation ; the consequence of which was that the edges of the eschar became raised all round, without however being entirely detached.

Mr. Draper, aged fifty, had a small irritable ulcer of a month's duration, and of the size of a horse-bean, upon the skin, with surrounding inflammation

to the extent of several inches. I applied the nitrate of silver to form an eschar, and protected it with goldbeater's skin.

On the following day it appeared from the flatness of the surface that the eschar was adherent; the inflammation remained as before.

On the next day the eschar was raised all round its borders, presenting the appearance of an elevated ring. I made an opening in one point of this ring by a lancet, and evacuated the fluid; and again applied the nitrate of silver all round, to give firmness to the edges of the eschar.

On the succeeding day an opening was made in the centre of the eschar, and a little more fluid was evacuated.

This mode of treatment was continued daily for about a week. The inflammation gradually subsided; the eschar became adherent and corrugated. In about three weeks, the patient thinking the sore quite well, detached the eschar. There was still, however, a minute ulcer left, which was touched with nitrate of silver. It required no further attention.

Of Ulcers attended with Inflammation.

If ulcers attended with inflammation should occasion constitutional disorder, I would prescribe the patient an emetic of ipecacuanha, and a dose of calomel, followed by an active saline purgative. Apply a bread-and-water poultice every eight hours on the

ulcer, and two or three folds of linen moistened with cold water constantly over the ulcer and inflamed surface, and enjoin the patient to keep in bed for twenty-four or thirty-six hours.

After this period the treatment, as directed for large ulcers, with the nitrate of silver, black lint, and neutral ointment, &c., may be generally pursued. Should there still be swelling or œdema arising from the ulcer, it will be necessary to enjoin absolute rest in bed, or under such circumstances the ulcer will not heal.

Of the Treatment of Ulcers with Inflammation.

Before I detail any cases of the mode of healing ulcers to be described in this place, I must give the formula for the neutral ointment and black lint.

I use the following formula of Kirkland's neutral ointment in preference to others which have been published in other works, as follows:—

℞. Emp. plumbi, ℥vj.
Olei olivæ, ℥ijj.
Cretæ ppt. ℥ivss.
Aceti distillati, ℥iv.

The acetic acid and chalk must be well mixed in a mortar, and the lead plaster and olive oil previously melted together are to be added. The whole is then to be stirred together until cool. To be kept under a little water.

I find this cerate very useful, spread on linen, as a defence, after using the nitrate of silver. From its

slightly adhesive property, it is easily removed, leaving the black lint and eschar undisturbed.

The formula for the black lint is as follows:—

R. Argenti nitratis, ℥ij.
Aquæ distillatæ, ℥iv. misce.
Fiat solutio.

An ounce of fine lint is saturated with this solution, and then exposed in a flat, shallow vessel, to dry by evaporation.

The black lint is a very useful application to small ulcers, where there is but little discharge or suppuration; by its absorbing any secretion, an adherent eschar is formed under it, and the ulcers healed.

When a large ulcer is healing but slowly, and it is not necessary to apply the stick or solution of the nitrate of silver, the black lint is applied with benefit, and an adherent eschar is sometimes formed from the first application, and when the ulcer is healed the lint and eschar drop off. If it should not become adherent, the treatment must be repeated.*

CASE 81.—Mr. B—— had a fall, and lacerated his shin about five weeks ago. He had used various applications without relief. The wound was about an inch in length, and half an inch in breadth.

There was a firm slough occupying a great part of it; the surrounding skin was inflamed several inches in extent; the patient complained of much pain, and

* For reference I have repeated the formulæ of the preparations at the end of this work.

was unable to attend to his employment. I prescribed him a calomel pill to be taken at bedtime, and a purging draught the following morning.

I applied the nitrate of silver on the inflamed and ulcerated surfaces, passing it over them twice. I then applied a piece of lint on the sore, and covered every part of the inflamed surface with the neutral ointment, spread upon linen, and lastly, I applied a calico roller to keep on the dressings.

In four days I visited my patient again. He said he was much easier, and had been able to walk about. The inflammation was gone, and that part of the sore not covered with the slough had the appearance of healing.

In three days more the slough came away, and I applied the nitrate of silver over the whole sore, and a little on the surrounding skin.

In four days more the ulcer was healing, and free from any irritation or pain.

My patient took a journey after this, and had a little nitrate of silver with him, to apply every third day. In a few days he sent me word that the sore was quite well, so that it must have healed by one or two more applications.

CASE 82.—Mr. Pindar, joiner, aged thirty-five, hurt his shin against a cart, seven weeks ago. The wound had been getting gradually worse since that time. The last application made to it was a mild ointment, and a poultice. The sore on the shin was of the size of a shilling, or larger, and nearly the

whole of the leg was inflamed: there was œdema of the ankle and instep. My patient was obliged to desist from moving about. I prescribed a dose of opening medicine, a bread-and-water poultice to be applied over the sore, and rest in bed for twenty-four hours. I then applied the nitrate of silver twice over the ulcer, and the whole inflamed surface. I covered the ulcer with lint, and the whole of the leg with neutral ointment, spread on linen; I put a fracture cradle over his leg.

In four days the inflammation on the superior part of the leg was gone, but the œdema and irritation on the instep was greater than usual after this mode of application. On examination I found an abscess a little above the ankle, and, on opening it with a lancet, some pus was evacuated. I applied the nitrate of silver on the ulcer, and once lightly over the surrounding skin, for an inch or two, and likewise within the cavity formed by the abscess. I then applied a cold bread-and-water poultice to the abscess, and lint and neutral ointment to the sore.

In three days more all inflammation and irritation were gone, and the sores were healing rapidly. My patient had resumed his work. I applied the nitrate of silver, and the lint, with the neutral ointment. By three more applications the sore was perfectly well.

CASE 83.—Mary White, aged thirty, had a small sore, six months ago, from scratching the leg.

Afterwards a violent inflammation came on, spread all over her leg, and produced about twenty ulcers,

from the size of a shilling to the size of a pea. These ulcers caused much pain, irritation, and heat, and prevented sleep at night. This patient was daily getting worse. The last application she had used was saturnine lotion, and a poultice. She had taken saline purgatives.

I desired her to keep her bed for a day and night, and to continue the white bread poultice, and take a dose of opening medicine. I then applied the nitrate of silver over the whole inflamed and ulcerated surfaces, lint on the sores, and neutral ointment over the whole; lastly a compress of linen, and a common roller, were applied lightly.

In four days the inflammation had nearly subsided. My patient expressed herself as having experienced very sensible relief after the smarting pain occasioned by the nitrate of silver had subsided: she said she had slept at night, and had been nearly free from pain during the day. The sores had a healthy appearance. I retouched them, and the skin directly surrounding each ulcer, with the nitrate of silver: I prescribed a dose of opening medicine to be taken every second morning. The bandage was applied rather more firmly.

In three days more the inflammation was gone, the ulcers were healing very rapidly, and indeed, some of the smaller ones were quite healed. By two more applications the ulcers were quite healed, and this in a fortnight from the first.

I saw my patient twice a week for several weeks afterwards to examine the bandage, to apply the nitrate of

silver on any tender or slightly inflamed spot which should make its appearance—a precaution which secures a permanent cure.

CASE 84.—Mary Williamson, aged sixty-nine, fell down and bruised her shin: this was followed by swelling; she rubbed the part with the soap liniment, which inflamed it much; she afterwards applied a poultice, but the leg still got much worse for six weeks; she then went to an infirmary, and remained under surgical care for eight weeks. The sore was now healed, but the inflammation still remained over the whole leg. The patient then placed herself under the treatment of an empiric for three weeks. Still uncured, she returned home into the country, and attempted to work at a cotton factory. This she did with much suffering, and soon became quite unable to do that or any other avocation. She came to Nottingham and fell under my care. At this time the whole of the leg was inflamed and affected with œdema—a large abscess had formed under the malleolus internus, and a smaller one on the opposite side. There were several ulcers on the shin, from the size of a crown-piece to that of a sixpence.

I prescribed a dose of opening medicine, and directed her to keep in bed for twenty-four hours. I washed the leg afterwards with soap and water, opened both the abscesses with the lancet, and applied the nitrate of silver over the whole extent of the inflamed surface, over the ulcers, and within the abscesses; I then applied a poultice to each of the abscesses, lint upon the

ulcers, and the neutral ointment over the whole of the inflamed parts in the manner already described.

In four days, the patient having still kept her bed, all inflammation was gone, and the ulcers and abscesses were in a healing state. I again applied the nitrate of silver to the ulcers and abscesses, and dressed them with lint and neutral ointment.

In four days more there was very great improvement—the abscesses nearly well, and the ulcers were healing rapidly.

In another four days the abscesses were healed, the ulcers healing fast.

It was necessary in this case to continue the application of a bandage to the leg for several weeks, and to apply the nitrate of silver to parts which became slightly inflamed from time to time.

CASE 85.—George Knowlson, aged twenty-two, had typhus fever about three years ago, followed by considerable inflammation and swelling of the right leg. Shortly afterwards two ulcers made their appearance on the fibular side of the leg, and have continued ever since, being sometimes larger and sometimes smaller; he had used common dressings.

When I first saw him, there were two ulcers nearly the size of half-a-crown, and of a dark purple colour, attended with inflammation of the whole leg, and cedema of the foot; the leg was swollen, so as to be one-third larger than the other. He had been kept from his occupation of a groom for twelve months.

I directed a poultice of bread and water to be applied over the ulcers, and prescribed a pill with calomel to be taken at bedtime, and a purging powder of rhubarb and sulphate of potass on the following morning, and enjoined him to keep his bed for a day and a night. On the following morning I applied the nitrate of silver over the whole inflamed surface, and lint on the ulcers, and defended the whole with a plaster of neutral ointment and a bandage.

On the fifth day the sores had changed their character and appeared healthy, the inflammation had disappeared, and the limb was less swollen. I applied the nitrate of silver to the ulcer, and lint, the neutral ointment, and a compress of five or six folds of fine linen over the wound, and then the roller tighter than before.

The nitrate of silver was applied every third day after this period. The ulcers were quite healed in less than three weeks.

The roller was still well applied, my patient was able to attend to his employment, for there was no vestige of ulceration or inflammation, and the swelling was quite gone in a month from the first application.

Old Ulcers of the Legs.

Formerly there was no department of surgery so tedious to me as the management of old ulcers of the legs. I rigidly pursued the plan recommended by Baynton as being that most approved.

This practice proved insufficient in most cases. After several weeks of daily dressing, and frequent interruptions during that time occasioned by fresh attacks of inflammation, and by excoriations from various causes, I have many times just succeeded in healing the ulcer when I had the mortification of seeing my patient return with renewed inflammation of the leg and the beginning of fresh ulceration. I was therefore naturally led to various modes of applying the nitrate of silver to old ulcers. After many experiments I adopted the following plan :—A patient presents himself, with one or more ulcers of the leg, with a dark greenish or purplish surface, deep and hardened edges, foetid smell, attended with inflammation covering perhaps a great part of the leg, with enlargement of the vena saphæna, sometimes cedema of the foot—having perhaps not experienced a good night's rest for years—the pain, heat, and itching sensation being dreadfully distressing to him, and his health altogether being much impaired. He is obliged, perhaps, to follow his daily avocation—often in those cases laborious—and in this way may have dragged on a miserable existence for years.

The first thing I direct my patient to do in such a case is to apply a common bread-and-water poultice, and afterwards keep it constantly damp with a little cold water, to remain in bed for eighteen or twenty-four hours to allow any swelling of the leg to subside, and to take a dose of aperient medicine; the leg is after this to be washed well with soap and water

to free it from any oleaginous substance or loose cuticle; it is then to be wiped dry with a towel. The inflamed part is to be moistened with *soft* water, and the nitrate of silver passed twice over it, and a little beyond it on the healthy skin, and then applied more freely to every part of the ulcer, particularly the edges and skin immediately surrounding.

A piece of lint is to be put over the ulcers, and linen, spread tolerably thick with the neutral ointment, over the whole inflamed and ulcerated parts; a compress of linen, and a common calico roller are last of all to be applied, the latter not too tight, but sufficiently so to retain the dressings in their place.

The patient is obliged to remain a few hours in bed on account of the pain occasioned by the application of the nitrate of silver; but after this has once subsided he enjoys more relief than from any other application, and sleeps soundly all night for the first time perhaps for years. The dressings are to be taken off at the expiration of the fourth day, when the inflammation will be found to have nearly subsided, and the ulcer to have a more healthy appearance. If any of the plasters adhere, they may remain until the time of the next dressing. The applications on the ulcer itself are easily removed, as there is usually a free discharge of lymph from its surface, and the neutral ointment is but very slightly adhesive. It will be also observed that there is not the least foetor, owing to the antiseptic property of the nitrate of silver, as it quite prevents the putrefactive process.

Another dressing similar to the one before may be applied, and this may remain for four days, by which time the sore will usually present a thoroughly healthy character.

It is well known that old ulcers of the legs were formerly the opprobrium of surgery, and I recollect a remark made in one of our periodical works soon after the publication of my Essay on the Nitrate of Silver, that "old ulcers of the leg in 1830 would be old ulcers of the leg in 1840," meaning that no improvement would be made.

After the lapse of thirty-four years I am led to conclude that there is a very manifest improvement in that department of surgery—not so much from the permanent cure of old ulcers by the use of the nitrate of silver, as I anticipated, but by what is far better, their *prevention* by the early use of that remedy.

I have no doubt that if the method given in these directions for subduing external inflammation, and for the treatment of bruised wounds and small ulcers by the use of nitrate of silver were attended to, with the occasional assistance of graduated pressure by compress and bandages, or the elastic stocking, we should seldom have severe cases of old ulcers of the legs.

From my own observation and inquiry I am led to believe that old ulcers of the legs have materially decreased in number in this locality, both in hospital and private practice.

I have now for many years abandoned the attempt

to heal old ulcers by eschar on account of the inconvenience and trouble attending the evacuation of the fluid from beneath the eschar, which is daily necessary to ensure an adherent eschar.

When old ulcers have obtained a healthy appearance from the treatment already described in this chapter, I would adopt the course laid down for large ulcers—*i.e.*, the use of the nitrate of silver, or black lint and neutral ointment.

The present plan of water-dressing in surgery, I think, will be found a very valuable addition to nitrate of silver for the treatment of ulcers.

CHAPTER VII.

OF BURNS AND SCALDS.

IN the first class of burns and scalds, where there is superficial inflammation, and in the second where there is simply vesication without destruction of the cutis vera, the application of the nitrate of silver, as directed in erysipelas, is often a speedy remedy. The vesicles should be removed, and the nitrate of silver, either in the stick or concentrated solution, should be slightly passed *once* over the burnt or scalded surface. I would make the following observations in favour of the remedy:—

1st. The nitrate of silver in its application does not appear to increase the pain of recent burns or scalds; but soon after the suffering is much diminished, by its subduing the heat and burning pain.

2nd. It most effectually excludes the air from the injured parts, and at once forms a covering superior to any other.

3rd. The nitrate of silver has the peculiar property of preventing subsequent inflammation and sloughing. Therefore, the burn or scald is limited in its extent, diminished in its severity, and consequently less

dangerous, for the danger is generally in proportion to the extent of surface destroyed.

4th. After the application of the nitrate of silver, the parts should be exposed to the air, if practicable, to form an adherent eschar. This will be found invaluable in burns and scalds of the face, breast, and abdomen, the latter being protected by a fracture cradle when in bed, to defend the parts and facilitate the formation of an adherent eschar. If from accident or any other cause the eschar should be removed, a renewed application of the nitrate of silver will be required.

5th. Where the parts cannot be exposed to the air to form an adherent eschar, as on the back, &c., the nitrate of silver must be applied, and afterwards covered with plasters of the neutral ointment, as directed, spread on linen, and then secured lightly by a bandage. The dressing must not be removed before the fourth day, at the same time allowing any adherent dressings or eschars to remain until they separate. After the separation, should there be any sore or inflammation, a slight application of the nitrate of silver or black lint may be applied, with or without the neutral ointment, and repeated every third or fourth day as required.

6th. After the application of the nitrate of silver to a sore or ulcer, its action continues for three or four days, but ends on the fourth.

In the third and most severe class of burns I do not use the nitrate of silver unless there is cutaneous

inflammation arising from these sores. I use the sulphate of copper for the suppression of granulations, as the nitrate of silver is inadequate. If there be debility, particular attention should be given to the digestive organs—change of air, nutritious food; quinine, with compound infusion of orange-peel, &c., should be administered.

An opiate may be given at the commencement of the treatment with advantage, if thought necessary, before the application of the nitrate of silver.

Cases of Recent Burns and Scalds.

CASE 86.—A servant-maid, whilst ironing, burnt the back of her hand, to the extent of several inches, with a hot iron. Very acute pain and inflammation were felt immediately after the accident.

The part was moistened with water, and the nitrate of silver passed once lightly over it, as in external inflammation. The application caused severe smarting pain for a short time, but this soon ceased; and there was no subsequent vesication or any further inflammatory action. The eschar separated in a few days, leaving a healed surface underneath.

CASE 87.—A lace-mender had the misfortune to set fire to a piece of net, and in endeavouring to extinguish the flame, burnt her hand and arm.

Cold lotions were applied during the day and through the night. On the following morning her friends were alarmed at a violent inflammation spread-

ing rapidly up the arm. When I saw her the hand and arm were much swollen and red, but there was no distinct vesication. The inflammation was passing up the arm, and had an erysipelatous appearance. The patient complained of much heat and pain, and her countenance was very pale. She was weakly and delicate.

I applied the nitrate of silver twice over the whole surface, and gave purgative medicine.

This had the desired effect of removing all inflammation. Slight vesication was caused by the application, which went away in four days. From that time she made no complaint.

CASE 88.—A servant-maid had some boiling molasses poured upon the back of the hand, which removed the cuticle over a space of two inches, and caused diffused inflammation over several inches more. The nitrate of silver was lightly passed over the whole surface once. An adherent eschar immediately formed over the denuded part, and no vesication followed on the inflamed surface. This patient required no further attention.

CASE 89.—A boy had some boiling water spilt on his foot. I saw him two hours after the accident. The outside of the foot and the heel were scalded severely. There was one large blister several inches in length. I punctured the blister, removed the loose cuticle, and applied the nitrate of silver once lightly over the exposed surface. As it was night, he went to bed, keeping his foot uncovered.

On the next morning an adherent eschar was found to be formed. He put on his stocking and shoe, and went about; and yet, what is remarkable, the case required no further attention.

CASE 90.—Miss B——, aged twenty, a healthy young woman, applied to me on account of her foot, which had been scalded with boiling water from the teakettle a month before. She had used lotions and ointment.

The sore occupied a great part of the instep, and there was a superficial slough covering a great part of its surface. It did not appear to have the least disposition to heal. I removed the slough with the scissors and forceps, and then applied the nitrate of silver to form an eschar.

I had on several successive days to pierce the eschar and allow a little fluid to escape. The eschar then became adherent, and my patient was nearly free from pain, and enabled to walk about. The eschar did not separate for a month, and then the sore was observed to be perfectly healed.

Had this case been attended with much inflammation, I should have applied the nitrate of silver every fourth day, and neutral ointment over the eschar, as in the following case :—

CASE 91.—Mr. Garton, aged sixty-nine, scalded the forepart of his leg several weeks before I visited him. There were then several ulcers on the shin—one the size of a half-crown, the others of smaller size. The inflammation was severe, and extended over a great

part of the front of the leg. This appeared to be a proper case for the same treatment as that required for inflamed ulcers arising from other causes. I therefore applied the nitrate of silver to the inflamed parts and ulcers, and defended them with the neutral ointment.

In four days the inflammation was nearly gone, and the ulcers were in a healing state. By four more similar applications the leg was quite well. My patient was not at all confined to his house.

Erysipelas from a Burn.

CASE 92.—Mrs. Bell, aged thirty-four, had the lobe of the right ear burnt, about a fortnight ago. She was afterwards exposed to cold and wet for several hours. She became affected with severe shivering, succeeded by fever; the ear was slightly inflamed. I prescribed an emetic, a dose of calomel, and purgative medicine.

On the following morning the ear was much swelled; the inflammation had spread to the face, temple, and upon the scalp on the back part of the head.

I removed the hair from the inflamed scalp, and applied the nitrate of silver over the parts affected.

On the evening of the same day there was every appearance of the inflammation having been checked; but on the following day I found it spreading in every direction, and my patient complained of much chilli-

ness and headache ; the pulse was 100. I directed more of the hair to be removed close, with the scissors, as the patient could not bear the razor. I should, however, in all cases, recommend that the head be shaved when the scalp begins to be inflamed, that no obstacle may exist to the effectual application of the nitrate of silver. This remedy was in the present case applied to every part affected with the erysipelas.

Next morning my patient expressed great satisfaction in regard to the relief she had experienced soon after the application of the nitrate of silver. She said she had no soreness in any part to which this remedy had been applied.

On each of the two following days I had again to apply the nitrate of silver where the inflammation was still spreading ; but on the sixth day from the first application all inflammation had subsided.

The cure was certainly rather retarded from not shaving the head, and from not using the nitrate of silver promptly and extensively on my first visit.

A Case of a Severe Scald treated by the Nitrate of Silver.

The following case of severe scald demonstrates the utility of the nitrate of silver in this kind of affection, while it exemplifies its power in changing and controlling the action of the capillary vessels.

CASE 93.—A little child, five years of age, was, whilst naked, pushed backwards by another child, into

a large pan of scalding water, which had just been taken off the fire. It was taken out as quickly as possible, and yeast was applied upon the injured parts. It was visited in an hour after the accident. The whole of the back, as high as the shoulder-blade, and as low as the middle of the thighs, was found severely scalded ; the cuticle removed from some parts, and in other parts raised into large vesications. The whole of the belly, the penis, scrotum, and thighs, were also in a similar state, but not so severely scalded as the back. An opiate was given, and the yeast was removed with a sponge and warm water. It was well that no oily application had been used, as the removal would have required more trouble, and have given more pain. The loose cuticle was removed, with that of all the larger vesications, and the small ones were punctured, to gain a clear surface to which the nitrate of silver might be applied.

The whole surface was then moistened with pure water, and a long stick of the nitrate of silver was applied flat, once lightly over the whole surface, and a little on the surrounding healthy skin.

A little linen, just moistened, was then passed over every part to diffuse the nitrate of silver, so that no spot might be untouched. The child cried much less than was expected when the nitrate of silver was applied on the denuded cutis. The back, on which the child would have to lie, was then covered with the neutral ointment, spread upon linen, secured by a bandage. The thighs and belly were left exposed to

the air, to form an adherent eschar, being defended by a fracture cradle.

On visiting the child, about eight hours afterwards, it was reported to have fallen asleep in a quarter of an hour after the application of the nitrate of silver, and to have complained of no pain since. There appeared no constitutional disturbance.

The very first morning after the accident this little patient was found on his side enjoying some playthings with several playfellows who were by the side of the bed. One part on the side of the thigh was much swollen and inflamed, and there it was discovered the nitrate of silver had not been applied. The whole of the belly and the other parts of the thighs exposed to the air looked very well, with scarcely any vesications; the eschars were removed in two places, where the tapes of the bandage had crossed the belly; these parts were now defended by means of a small plaster of the neutral ointment, spread on linen. On some parts the eschars were floating on the serum; these afterwards became adherent: the scrotum and penis were much swollen, but gave no pain. The nitrate of silver was applied on the part not attended to at the first dressing.

On the second day the child was going on well, some of the eschars were becoming adherent; the scrotum and penis continued much swollen, but there was scarcely any pain, and that little was felt on the belly.

There was slight heat of skin, and the tongue was

a little loaded. A purgative of senna and salts was given.

On the third day nearly all the eschars were found adherent, and the scrotum and penis less swelled.

On the fourth day the eschars were quite adherent on the belly, and the penis and scrotum were of the natural size.

On the fifth day the plasters of neutral ointment were removed from the back, which presented an appearance of a recently blistered surface, in a healing state, with some loose cuticle partially attached: there was no appearance of suppuration.

In several days more the back was healed, except in two or three small parts, which were scalded more deeply than the rest, and were covered over with coagulable lymph, not the least suppuration having taken place. The eschars were peeling off, leaving the subjacent surface quite healed.

On the tenth day this little patient was out of doors, and on the twelfth at school, every part being quite healed.

Hard and Painful Cicatrization after a Burn.

CASE 94.—Timothy Coleman, aged thirty-two, whilst in a state of intoxication, burnt his shoulder and arm very extensively. He was under the care of a surgeon, and the sore was healed in ten weeks. There still, however, remained an inflamed surface over the deltoid muscle larger than the size of the hand.

It had the appearance of fungus cicatrized over, and was attended with so much heat and pain as to prevent him from sleeping at night, or following his employment in the day, for thirteen weeks, even after it was said to be cured. He had used a number of remedies. His health continued good.

I first saw him on June 20th. I applied the nitrate of silver, as in external inflammation, over the whole diseased surface. I directed the part to be exposed to the air for three days, and then covered with the neutral ointment.

As my patient resided at a distance in the country, I did not see him again for a fortnight, when he informed me that eight hours after the application of the nitrate of silver he had more ease than he had experienced since the accident, that he was nearly free from pain, and slept well.

I again applied the nitrate of silver very freely on the whole affected surface, as there still remained several inflamed spots, besides several slight ulcerations caused by the nitrate of silver. I then covered the part with the neutral ointment.

In another week I saw my patient again. He said he had suffered more from the last application than from the former one; that it had acted more like a blister; that there had been a very free discharge; and that the eschar had separated sooner.

There appeared, however, scarcely any irritation, except from a few superficial ulcerations, over which

I passed the nitrate of silver very lightly; I continued the neutral ointment.

A few weeks afterwards this man called on me to say that he was quite well.

This peculiar case is almost incurable by any other means.

APPENDIX.

I.

In this short appendix I purpose to give a few cases of a desultory character, which I could not well embody in the work.

Of the Use of the Nitrate of Silver as a Blister.

I was led to think that in many cases the nitrate of silver might have a decided superiority over cantharides as a blister, particularly as its action is quicker, the pain arising from it of shorter duration, and any constitutional irritation it may produce, even in children, is but slight; because it does not bring on any affection of the bladder or produce the least strangury.

The mode of application is simply to wet or rather moisten the space to be blistered with pure water, and then to pass a stick of the nitrate of silver four or five times on the part, according as the cuticle is thin or otherwise; or the concentrated solution may be used in a similar manner. Directly the part begins to smart, but this generally does not continue long, and in the course of from two to four hours the blister insensibly rises; but little attention is required in dressing the blister; it is usually healed in four days. The effect of the nitrate of silver is too superficial to produce a deep eschar or injure the cutis vera.

I cannot say whether the blistering with the nitrate of

silver produces any specific or peculiar effect on internal extensive inflammation ; on that account I have not tried it in pleuritic, peritonitic, and other internal inflammations, although I do know that a free application of the nitrate of silver on the scalp in erysipelas prevents any cerebral affection, and probably in cases of inflammation of other parts of the body the application may prevent mischief to the subjacent internal parts.

I have blistered strumous affections with the nitrate of silver previous to the application of iodine with apparent advantage ; but I have not given so much attention to the salt as a blister, although I think it worthy of future investigation.

The following case presents a most decisive instance of the value of the nitrate of silver used for this purpose, or as a blistering agent:—

CASE 95.—Mr. C——, aged thirty-five, had been affected several times with virulent gonorrhœa. He was again infected three or four weeks ago ; in four days he had severe chordee ; the usual remedies were administered, and leeches were applied along the course of the urethra. The discharge ceased, but the inflammation became so severe as to require, in the course of three weeks, the application of a hundred and twenty leeches, and he was twice bled from the arm : he had frequent warm baths, and purgative and anodyne medicines were given, but without any amendment in his complaint.

I was called to this patient, in consequence of a total retention of urine, late at night. I passed the catheter, and gave him sixty drops of laudanum ; the next morning he informed me that he had passed a very bad night, and was still unable to pass urine. On examining the perinæum I found it very hard, swollen, and tense. He complained of a most distressing aching pain striking in a direction to the left side of the abdomen. This pain had been so severe for nearly three weeks that Mr. C—— had been totally deprived

of sleep, so that he was almost exhausted ; his countenance was exceedingly pallid.

I moistened the perinæum and the whole course of the urethra to the end of the penis, and then applied the nitrate of silver very freely, so as to cause immediate vesication. My patient complained much even before I left the room. I visited him in eight hours, and learnt from him that he had experienced a severe burning pain for three-quarters of an hour, and afterwards a smarting pain for several hours ; all pain, however, had then left him, and he was perfectly easy, but he had passed no urine.

On the following morning he was still perfectly easy, had passed a good night, and had enjoyed more sleep than he had done for three weeks. There had been a very free discharge of serum from the blistered part. No attempt had been made to pass urine. The catheter was used.

The next day the blistered part had a moist, soft, doughy feel, and had lost all the character of inflammation ; there was still a free discharge of serum.

This discharge continued for four days after the application of the nitrate of silver.

No further local remedy was required. I gave him saline and purgative medicine.

The use of the catheter was resumed at times.

About a week after this period a free gonorrhœal discharge came on, and continued for some time ; but it yielded to the common remedies.

Cases of Gun-shot Wounds.

I have no doubt that the nitrate of silver will be found a valuable remedy in cases of gun-shot wounds. The directions laid down for the treatment of large punctured, bruised and lacerated wounds, will, I think, be applicable to many cases of this kind.

In gun-shot wounds the nitrate of silver will answer

several important purposes. It will prevent inflammation, moderate pain, and keep the orifice of the wound open, for the exit of sloughs, pus, &c. ; it will, in cases in which the parts are much bruised, preserve the integuments from sloughing ; and in large lacerated gun-shot wounds it will often prevent an open state of the wound by insuring adhesive inflammation.

The three following trifling cases of gun-shot wounds will illustrate, in part, the views which I have formed upon this subject :—

CASE 96.—A girl was shot in the arm by a small gun ; a portion of paper wadding was embedded in the outside of the fore-arm. I saw the case soon after the accident, and removed the wadding ; the wound did not bleed, but it had a black appearance. I applied the nitrate of silver on the surrounding skin and to the edges of the wound, and dressed it with adhesive plaster, as if to heal it by the first intention.

I did not remove the plaster till the expiration of nine days. There had been no inflammation or swelling. The patient complained of no pain after the application of the nitrate of silver. The wound had the appearance of a superficial issue with a little slough at its bottom. I applied a little lint on the wound, spread with neutral ointment.

Three days afterwards I examined the wound again, and found it even with the skin ; the slough had been thrown off. I applied the nitrate of silver slightly over the wound and upon the eschar, the lint and ointment as before.

By two similar applications this wound was quite healed just three weeks from the time of the accident.

CASE 97.—Mr. Lowndes' son, aged fourteen, on the 5th of November loaded heavily a part of a large gun-barrel ; in discharging it, it burst and wounded two of his fingers ; the ring-finger was burst open at the second joint, so as to expose the capsular ligament, and the inside of the joint. I applied the nitrate of silver over the whole of the skin of both fingers, and partly upon the hand. I then brought the edges

of the wound together by means of adhesive plaster, and supported the finger by a small splint.

On the second day there was more swelling of the finger than I expected; on that account I took the splint away, and cut through the adhesive plaster on the opposite side, so as to remove any tightness. The finger did not drop, being now supported by the firm eschar around it, and by the adhesive plaster. There was some swelling and inflammation of the hand, to which I applied the nitrate of silver.

On the sixth day from the accident I removed the adhesive plaster; the lacerated surfaces had remained nearly in contact, and there was but a small line of wound, and that was free from any irritation. I passed the nitrate of silver over it, and afterwards applied lint and the neutral ointment.

By three other similar dressings, the wound was healed; the finger remained rather bent, and the joint stiff.

In this case, the healing property of the nitrate of silver was very apparent. As the boy had made no complaint of the other finger, which was but slightly wounded, I did not open it till after the expiration of a fortnight, when I found it unhealed; but it required but two applications of the nitrate of silver to effect a cure, so that this severe wound was healed in three weeks.

CASE 98.—Mrs. Leake's son, aged seventeen, was shot by the discharge of a large horse-pistol, loaded with small shot, when in his side coat-pocket.

On seeing him, one hour after the accident, I found that the skin of his side was superficially burnt to the extent of eighteen inches; the small shot had passed along the integuments; but on careful examination with the probe, I could discover none under the skin. I passed the nitrate of silver lightly over the whole surface; it caused a smarting pain. I desired my patient to remain in bed, and to have the clothes carefully kept from the wound.

Twenty-four hours afterwards, an adherent eschar was formed upon the whole surface. He said that the smarting

pain continued during two hours after the application of the nitrate of silver, but that he had been quite free from pain since.

Several days afterwards the eschar still remained adherent, except in one point, which required a slight application of the nitrate of silver. From this period the case required no further attention, and the eschars gradually separated, leaving the subjacent parts healed.

Cases of Neuralgia.

CASE 99.—Mr. Gadd, aged fifty, had a severe pain in the hollow of the instep, extending in a direction behind the malleolus internus. He could assign no cause for it. He had been obliged to rest for a whole week, during which time liniments, lotions, and other remedies had been applied. The pain was evidently becoming worse. There was no appearance of swelling or redness, but the parts were painful on pressure. I applied the nitrate of silver, as in external inflammation, along the course of the pain.

It caused a degree of smarting for a few minutes, and afterwards afforded marked relief.

On the next day there was very little pain. I again applied the nitrate of silver. The pain totally subsided, and my patient was able to walk about.

CASE 100.—Mrs. S——, in a weak state, left by an abortion, was seized with an acute pain, extending from the toes to the hip. Fomentations were applied without relief. The pain fixed more particularly about the calf of the leg, being more severe at intervals, and, to use her own words, partaking of the character of cramp. It was much increased by putting her foot to the ground. The parts were free from inflammation and swelling. I applied the nitrate of silver along the course of the pain.

On the following morning the pain was nearly gone. A second application of the nitrate of silver quite removed it.

CASE 101.—Mrs. W—— had a pain extending over a great part of the arm. The arm itself was a little swelled, but there was no redness. She could assign no cause for the affection. She was feverish, and felt generally unwell. I prescribed an emetic and purgative medicine, and applied the nitrate of silver along the whole course of the pain.

On the following day some vesications were observed to have arisen from the application of the nitrate of silver, but the patient expressed herself as being greatly relieved.

She required no further attention, and was well in a few days.

Case of Contracted Rectum.

CASE 102.—Mr. S——, aged fifty, applied to me in consequence of nearly a total obstruction in the lower part of the rectum, which he thought arose from internal piles.

On examination I found a stricture about two inches within the anus, so firm and small that the point of the finger could not be passed through it.

Mr. S——'s health had been gradually declining for a year, from being corpulent, he had become emaciated.

He had been unable to pass solid fæces for some time, and every effort to do so gave him much pain, and occasioned great irritation. I first introduced the largest urethra bougie; but this induced so much pain and irritation, and afforded so little benefit, that I was led to the expedient of applying a stick of the nitrate of silver within the contraction. This I effected with the common nitrate of silver case, using the index finger of the left hand as a director. The application caused a sense of burning heat in the part for two hours, with severe tenesmus, and a considerable discharge of mucus. My patient obtained so much relief, however, from the application of the nitrate of silver, that he was enabled to bear the introduction of a small bougie two days afterwards.

I persevered in the use of the bougie, and whenever the irritation became great I applied the nitrate of silver as before. By these means I was enabled in a short time to pass my finger through the stricture. I found it to be about two-thirds of an inch in extent; I could discover no ulceration.

I gradually increased the size of the bougie, and at the expiration of a few months Mr. S—— could bear the largest rectum bougie; he also gradually recovered his health and flesh.

Mr. S—— has continued the introduction of the largest rectum bougie once or twice a week now for several years.

In this case it is very evident that the patient's life was saved by the use of the nitrate of silver.

Case of Ulceration of the Tongue.

CASE 103.—Mr. C—— had a swelling and soreness of the tongue for six weeks. At the expiration of this period a distinct tumour formed upon the centre of the tongue, suppurated, and then presented a sloughy ulceration of the size of sixpence. Borax had been applied; and five grains of the blue-pill, with one-third of a grain of opium, had been taken night and morning for several weeks without any amendment.

I applied the nitrate of silver within the cavity of the ulcer and over its edge, and afterwards a little lint to confine the action of the remedy.

By eight such applications of the nitrate of silver, repeated every day, the case got perfectly well.

Case of Irritable Ulceration near the Eye.

CASE 104.—Mr. D—— had a very irritable ulcer near the inner canthus of the left eye, on which a poultice had been applied for a fortnight.

This ulcer gradually increased to the size of a large horse-bean, became deep, and had a sloughy appearance, with inflamed, irregular, and elevated edges, and it was evidently spreading fast. I first used a mild ointment and a lotion of zinc, but without any good effect.

I then resorted to the use of the nitrate of silver, applying it freely within the wound and upon its edges and the surrounding skin; and over the eschar lint and the neutral ointment.

In four days the character of the ulcer was altogether changed. It was free from inflammation and in a healing state.

Three more applications of the nitrate of silver, with intervals of three days, and it quite healed.

On the Fungous Ulcer of the Navel in Infants.

It sometimes occurs that a little fungous sore exists upon the navel in infants, which is difficult of cure in the ordinary way. I had one case which had subsisted for two years, and another which had continued for two months; both were, during those respective periods, a source of great trouble and uneasiness to the mothers of the little patients.

These ulcers are easily cured in the following manner:—The fungus is to be completely removed by a pair of scissors, and when the bleeding has quite ceased, the nitrate of silver is to be applied, and the part is to be defended by gold-beater's skin, and kept carefully from moisture.

In one of the cases mentioned above, the eschar was accidentally separated twice, and it was necessary to renew it; but both cases were cured in the space of a few days.

Chilblains.

All that is necessary in the treatment of chilblains is to apply the nitrate of silver, either in substance or solution, on the inflamed part.

If there is ulceration the nitrate of silver should be applied lightly on the ulcer, and on the surrounding inflammation. A little lint may be applied on the ulcer, and over it a plaster of the neutral ointment. If not healed by the first application, the same treatment may be repeated.

Professor Cooper, in his lectures, says—"The nitrate of silver is found to agree remarkably well with ulcerated chilblains."

In the "British and Foreign Medical Review," January, 1862, on chilblains, it says—"A pretty strong solution of the nitrate is required. Occasionally we have used a drachm to the ounce of water, and even more. In one obstinate case we used a saturated solution (equal parts of nitrate of silver and water) which produced a permanent cure."

Mr. Fricke, of Hamburg, recommends frost-bites to be rubbed over with the nitrate of silver, and says this is a very efficacious mode of treatment.

II.

For the following valuable communication I am indebted to my late brother-in-law, Dr. Marshall Hall, to whom it was addressed in a letter from Mr. Webster, surgeon, Dulwich :—

“MY DEAR SIR,—

“I sit down to do an act of justice to Mr. Higginbottom’s merits and my own feelings, in expressing to you the pleasure I have felt in perusing his work on the nitrate of silver.

“It is true the profession had some confused and indistinct notions on the benefit occasionally derived from the use of this remedy; but I believe I may with confidence say, that till the appearance of Mr. Higginbottom’s work, none of its members had any very correct ideas even of the proper mode of applying this remedy, far less of the extent to which it might be used in such a variety of cases. The account of the adherent and unadherent eschar is so rational and satisfactory, that I am sure it must carry conviction to every unbiassed mind, and moreover point out the cause of the failure of this excellent remedy in less experienced hands. In many cases a weak *solution* of the nitrate of silver has been used, which is not sufficient to produce an eschar. When the stick itself has been applied, the parts have been immediately covered with lint and adhesive plaster, so as to prevent the access of the atmosphere, which, however, seems necessary in all cases to produce an eschar, and thus the chief benefit has been lost by doing too much or too

little. I have often applied the nitrate of silver to wounds, with a view of healing them quickly, or of repressing granulations; but not understanding, till I read Mr. Higginbottom's book, the principle upon which it acted, I generally *covered* the parts instead of exposing them to the air; and have, in most instances, especially when the wound was of any extent, been disappointed of success, and mortified on finding the secretion of pus increased, instead of being lessened in quantity from the surface of the wound: and yet a process has occasionally passed under my eye that ought to have instructed me in a measure upon this subject. I knew that exposure of an ulcerated healthy surface to the atmosphere would sometimes greatly quicken the healing process—in fact, by forming a scab; and in some cases, as in wounds about the face, where it has been of importance to prevent any mark, I have pursued this method, but not liking to leave the parts wholly unprotected, I have applied a covering to protect the wound, and yet not prevent altogether the action of the air—I mean goldbeater's skin.

“If I might be allowed to theorize a little, I would say the eschar produced by the nitrate of silver acts by excluding the atmospheric air from the wound. This may seem paradoxical, as I stated above that I consider the access of atmospheric air necessary to the cure; yet so it is, for it acts by producing a thin scab or crust, and protects the part below, so as to allow it to skin over. And so when the nitrate of silver is applied, it forms a thin layer by uniting with and decomposing the animal matter it comes in contact with; this gradually hardens and becomes black by exposure, and forms an almost impenetrable crust, which effectually shuts out the atmosphere. I suspect this crust may operate also in another way—in curing wounds merely by producing considerable pressure on the part; for if the eschar is closely observed, it is evident that it contracts and corrugates, and finally cracks and peels off. But to leave theory and come to facts, I have tried the nitrate of silver in several cases since

I have read Mr. Higginbottom's book, and it may be well to notice its effects in other hands.

"A boy had an extensive burn of the arm, which healed very slowly, in spite of a variety of applications and modes of dressing; the process occupied several months, and I applied the nitrate of silver when the wound was of the size of a shilling. It formed an eschar and required no further dressing: it would otherwise certainly have required two or three weeks for its complete cicatrization.

"Mr. W——, a clerk in a public office, accidentally struck his penknife about halfway into his thigh, on the outside.

"He called on me a few hours after, complaining of pain all up the fascia, and saying that he could scarcely move the limb. I applied the nitrate of silver to the wound and round its edges, and covered it with goldbeater's skin.

"The pain went entirely off in the course of the evening, and it healed without any other application.

"A young nobleman was bit by a terrier dog on the temple. The part sloughed and ulcerated, and, though attended with much care by a medical gentleman in the country, it was very difficult to heal. I saw him about a month after the accident, when there was a round superficial ulcer of the size of a half-crown piece. I dressed it in various ways for some time, without its advancing to cicatrization, though the wound looked very healthy. I then applied the nitrate of silver in the way recommended by Mr. Higginbottom, covering it with goldbeater's skin. It went on very well, and required no dressing. The eschar remained perfect for five days, when he accidentally received a slight blow on the part, which displaced part of the eschar. I reapplied the nitrate of silver, and when the eschar separated the part was found to be perfectly cicatrized.

"Believe me to remain,

"With much esteem,

"Yours very faithfully,

"GEORGE WEBSTER."

*Summary of Principles and Results of the Application
of the Nitrate of Silver.*

1. Nitrate of silver is not a caustic or corrosive substance, but, on the contrary, possesses a peculiar conservative property, calculated to preserve, and not to destroy, the animal tissue to which it is applied.
2. When an adherent eschar forms over a recent wound, the wound, under ordinary circumstances, invariably heals.
3. The direful effects of punctures from needles, nails, hooks, thorns, bayonets, saws, &c., are totally prevented.
4. In lacerated wounds the consequent irritation and inflammation are prevented or removed.
5. In recent contused wounds the inflammation is subdued, and consequent suppuration and loss of substance prevented.
6. In phlegmonous inflammation the progress of tumefaction and inflammation is arrested, and suppuration often prevented.
7. In simple acute erysipelas the inflammation is immediately arrested, and quite subdued in four days—when affecting the face and scalp, cerebral irritation is invariably prevented, and delirium ceases.
8. In phlegmonous erysipelas the inflammation is often arrested, and so far subdued as to prevent extensive sloughing of the cellular tissue; or if suppuration takes place it is similar to phlegmon.
9. In ulcers the inflammation is removed, suppuration modified, and the healing process greatly facilitated. These effects are very apparent in the treatment of phagedenic ulcers.

10. In large incised wounds, when the interrupted suture is used, inflammation and suppuration are prevented, and the wound heals by the first intention.
 11. In variola the early pustule is immediately arrested in its progress, and the pitting of small-pox is entirely prevented.
 12. In dissection wounds the specific poison is neutralized, and rendered innocuous, so that all danger is prevented.
 13. The healing process by the nitrate of silver is generally facilitated when the parts can be exposed to the air.
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*Formulae of the Remedies used in the Application of
the Nitrate of Silver.*

Pulvis Emeticus.

R. Pulveris ipecacuanhæ, ʒss.

Bicarbonatis potassæ, gr. x. Misce. Fiat pulvis.

A pint of warm tea or gruel to be taken directly ; in half an hour after take the emetic-powder in a little cold water ; and in fifteen minutes drink freely of warm water, gruel, or tea.

Concentrated Solution of the Nitrate of Silver.

R. Argenti nitratis, ʒviij.

Aquæ distillatæ, ʒi. Misce. Fiat solutio.

The solution to be kept in a covered bottle, to exclude the light.

Black Lint.

R. Argenti nitratis, ʒij.

Aquæ distillatæ, ʒiv. Misce. Fiat solutio.

An ounce of fine lint is saturated with this solution, and then exposed in a flat, shallow vessel to dry by evaporation.

Neutral Ointment.

R. Emplastri plumbi, ℥vj.
Olei olivæ optimi, ℥iij.
Cretæ præparatæ, ℥ivss.
Aceti distillati, ℥iv.

The distilled vinegar and chalk must be well mixed in a mortar, and the lead-plaster and oil, previously mixed together, are to be added. The whole then to be stirred together until cool. To be kept afterwards under water.

Cold Poultice.

Take a penny-loaf, remove the crust, and put the soft part into a pan with a pint of cold water: let it boil gently for about an hour, stirring it constantly till it is of a medium consistency—neither too soft to run, nor yet too stiff; when cold, spread it evenly, half an inch thick, on a piece of linen, and turn up the edges before you lay it on the part. Put the poultice in a basin for use, covering the surface with a moist cloth to prevent it from becoming hard. Lard, oil, or any other greasy application to be avoided.

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